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In the Interests of Commercial Motor Vessels

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MOTORSHIPS UNDER CONSTRUCTION

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An Oil Carrying Motorship With Unusual Machinery

Poseidon, a Full-Powered Diesel-Driven Vessel With a Reversing Propeller

By THOS. ORCHARD LISLE, A. M. I., MAR. E.

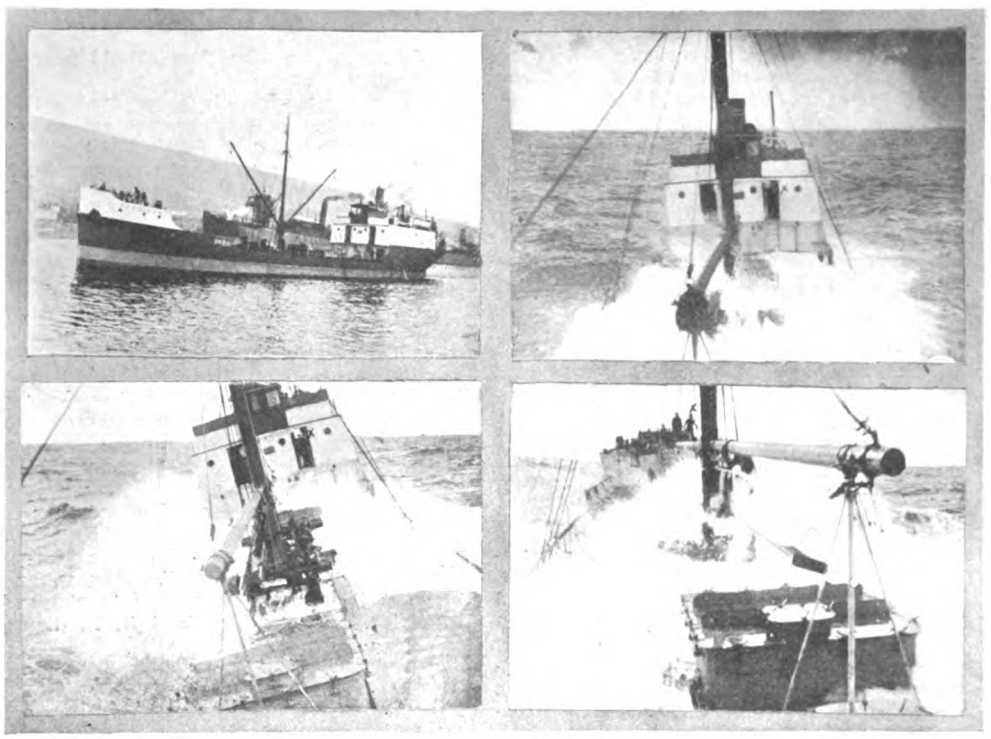
When we think of reversing-propellers most of us call to mind the little bronze fittings of motor launches that generally wear loose after a month's work; hence it will astonish many shipowners to learn that out of 24 full-powered ocean-going Diesel-driven mercantile ships equipped by a certain great European marine engineering firm during the last seven years, no fewer than five have reversing-propellers, instead of direct-reversing engines, one vessel being of 900 h. p. at 165 r.p.m. Furthermore, the makers claim that these reversible-propeller installations are to be numbered among their most successfully operating motor-ships, and that for 500 h.p. or less, per engine, they strongly advise them in preference to direct-reversible Diesel (including their own) oil engines.

Therefore, it accurately will be surmised that some great development in design and construction must have quietly taken place with the reversing propeller and that it cannot be the reversing propeller as known to most yachtsmen, otherwise a concern with such extensive Diesel-ship experience would not adopt this attitude, and, of course, the proof of the pudding being in the eating, they have the splendid working results of the five such ships to support their theory, one of 200 h.p. at 200 r.p.m. having been regularly running since 1909, and giving the consistency desired by the owner.

Reversing the direction of a large ship is by no means a simple operation, because of the strain thrown upon the machinery, and with a reversing propeller the blades may be required to reverse suddenly, with the engines under full load and plenty of way on the ship, so the successful tackling of the problem with big heavy-duty engines of high power is of considerable interest in consequence, particularly as it does not involve the question of the propeller only, but considerable modifications to the engine itself.

First of all, however, it is well to question as to the advantages obtained, and these may be enumerated as follows:

(1) Simplification of the main engine.
(2) Simplification in auxiliary machinery.
(3) Quick manoeuvering.



MOTORSHIP POSEIDON IN HEAVY WEATHER ON BAY OF BISCAY

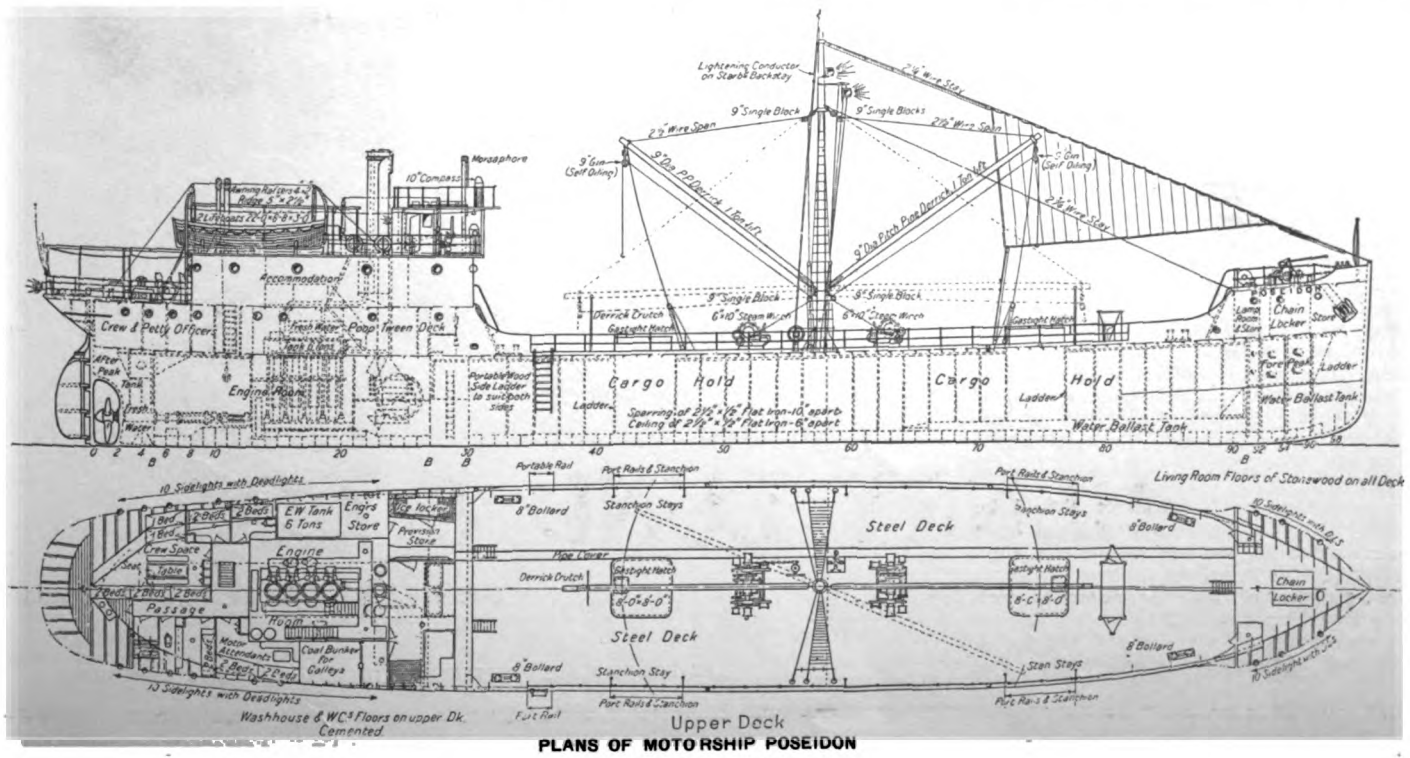
(4) Absolute control of ship from the bridge.
(5) Reduction in first cost of machinery.
(6) Reduction in compressed-air storage.

Against the reversible-propeller we have:

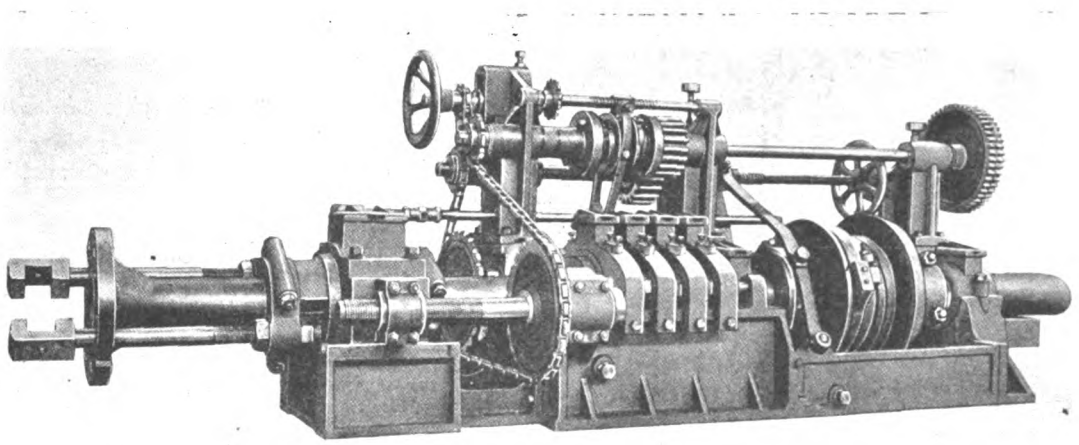
(1) More expensive propeller and propeller-operating gear.
(2) Slight loss in efficiency.
(3) Belief that the reversing-propeller blades will rapidly wear loose at the hubs.
(4) Engine must be installed aft.

There is no doubt that a cursory glance at the illustrations gives the impression that the mechanism for operating the blades is somewhat complicated and expensive; but it is necessary to more deeply probe into the above tabulated "fors and againsts" before condemning or approving of the design.

On the debit side there are the more expensive propeller, clutch, gearing, chain wheels, shafting and screwed rods, but if the blades are properly designed with a correct pitch for ahead gear, and arrangements are made to take up the thrust arising from the desire of the blades to determine their own angle on a fixed point in the boss when in full gear, and not on the running collar on the center shaft, there can be only the most



PLANS OF MOTORSHIP POSEIDON



MECHANISM (AND THRUST BLOCK) FOR OPERATING THE PROPELLER BLADES.

trifling loss of efficiency when working on account of any of these parts, as the chain wheels are running light and the loss of efficiency in the blades when running astern need not be considered.

On the credit side there is no reversing-gear required in the engine itself, which saves a camshaft and a complete set of cams, the sliding-blocks for reversing the position of the two cam-shafts, and the necessary actuating rods, links and levers. In addition to this, the size of the air compressor can be reduced to that which is sufficient to give a certain supply of fuel-injection air with a little margin for storing up sufficient air to start up the engine; this, of course, implies a great saving in the number of air storage receptacles and the space necessary for them. So far, it boils down to a pure question of dollars and cents and votes are in favor of the reversible-blade propeller system under this head.

There are, however, other advantages claimed; for instance—that the ship can go ahead and astern a hundred, or more, times in an hour without the use of compressed air is most important, as there is no chance of the engine being stalled when manoeuvering owing to lack of air in the storage tanks. In the case of a tow-boat this particularly applies. Again, with a constantly-running engine the manoeuvering is somewhat simpler, as the only thing that requires attention is the single hand-wheel for reversing, which is installed on the bridge right by the navigator's hands, so that he need not signal down to the engineer unless the connecting-gear by chance went wrong, under which circumstances the engineer would use his duplicate control-wheel. There is no air valve, throttle lever, or air-starting lever to be bothered with when manoeuvering.

An extreme point is the amount of oil which would be consumed by the engine when running light when manoeuvering or waiting for orders, but it is probable that just as much—if not more—fuel would be used in driving the auxiliary air compressors to keep the air-starting receivers full in cases where direct-reversible engines are installed. There is another claim, however, and that is, that a much better control can be exercised in the case of small boats, such as tugs, when getting under way, as the blades can be placed in a position which gives very small pitch indeed, and the boat can start so gently that no sudden strain will be brought upon the tow rope, whereas the ordinary reversible engine gets away in a hurry and it is very difficult to avoid putting a jerk on the rope. A tug-boat engaged in harbor service where considerable manoeuvering is required will require, if direct-reversible engines, an auxiliary air-compressing plant of quite substantial power to maintain the necessary air supply.

It is practically a **sine qua non** that when a reversing-propeller system is installed the engine must be fitted right aft, so that the reversing gear may be close up against the tail shaft and reduce the length of the hollow part of the rods for providing the fore and aft motion to a minimum, without separating the manoeuvering gear too far from the engine.

When summing up one's views it should be borne in mind that the builders would not have risked their reputation, neither would the shipowners have stood for it, unless their experiences definitely assured them that the reversible-propeller policy was a wise one up to certain limitations; also that both the owners and the builders had had plenty of motorship experience. For auxiliary sailing-ships they should prove particularly adaptable.

Now that we are fully acquainted with the reasons of such a radical step we can deal with an actual installation, namely that of the "Poseidon," a full-powered tank-ship of 835 tons dead-weight-capacity, owned by the Anglo-Saxon Petroleum Co. of London and engaged in ocean-going work in the Far East.

"Poseidon" is 185 ft. long by 36½ ft. beam, with 13 ft. 3 ins. moulded depth, and a loaded draught of 11 ft. 9½ ins. She is very low amidships, but has high superstructure aft, and a raised forecastle, the latter preventing her diving into the seas. The illustrations show her behavior during a severe storm in the Bay of Biscay.

Her machinery consists of a four-cylinder, 15⅞ in. bore by 26⅝ in. stroke, non-reversing Diesel-type crude oil engine, that gives 450 indicated horse-power (340 b. h. p.) at 175 r. p. m., which on trials gave the ship a speed of 9 knots. The engine itself is 14 ft. 8¼ ins. long, by 12½ ft. high and 6 ft. 7¾ ins. wide, and weighs 36 tons. Otherwise we need not describe it now, as, at the moment it is only the means to the end. The propeller that it drives is 8 ft. in diameter, by 9 ft. pitch with 16 sq. ft. blade area, so the magnitude of the task reversing these huge blades is easily realized. At the same time it becomes obvious that their very size affords deep shoulders and unusually large bearing surfaces for the roots of the blades, so that the wear of half-a-dozen years can only be so small as to have no appreciable derogatory effect.

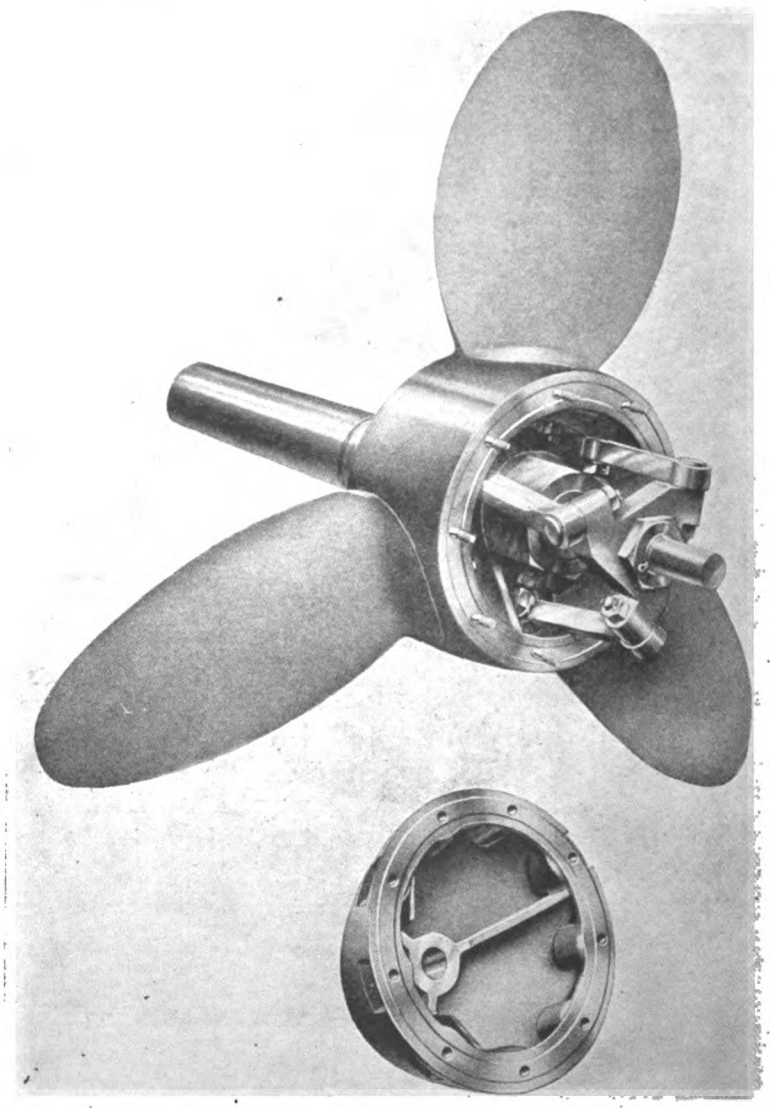
Power to reverse the blades and actuate the mechanism is furnished by the engine itself, which, of course, is constantly running in the one direction, and the use of this feature by the makers really is quite clever. Now it is obvious that under the circumstances the engine speed must be governed automatically, otherwise it would run away when the load was suddenly taken off, as with the blades neutral.

In an ordinary reversible marine-engine the main purpose of the governor is to prevent a heavy race, and for this some form of inertia governor has been found to be the best. In this case, however, the main function of the governor is to keep the engine running at a constant speed whether the blades of the propeller are in the neutral position and putting no load on the engine, or whether they are in the full forward or astern position putting full load on the engine, so that the control required is of a different nature. The objections to the ordinary type of rotary-governor for marine purposes are well known, and the builders designed a new type to overcome those objections and to meet the new conditions.

But experiences with the "Poseidon," however, decided that the control of the engine-speed while manoeuvering is best obtained by inter-connecting the throttle directly with the propeller reversing-mechanism, so that the stroke of the fuel pumps are automatically reduced, and increased by the mere action of throwing the blades into the neutral position, or by reversing them respectively. The possibilities of racing in heavy seas are looked after by the well-known Aspinwall governor, although the engineers of the "Poseidon" have found that the latter is not necessary.

The mechanism for reversing the blades now remains to be described, and this includes the thrust-block making its appearance formidable. It evidently has involved a lot of scheming. The

(Continued on Page 21.)



REVERSING-BLADE PROPELLOR WITH MOVABLE PARTS EXPOSED

Highest Powered Hot Bulb Engined Ship

"Bramell Point" of the Vacuum Oil Company's Motor Fleet

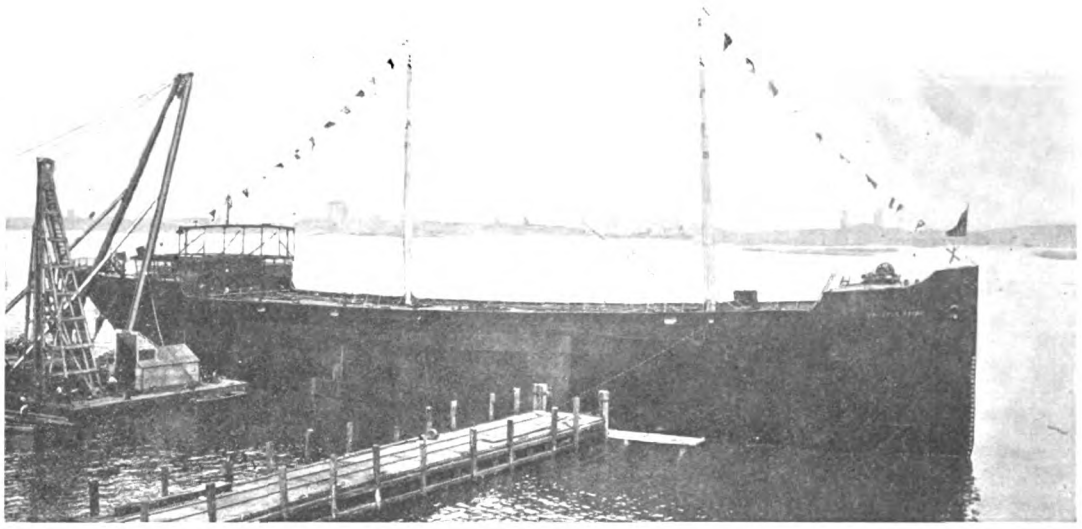
Because she is being equipped with the highest powered engines of their class ever built, the operation of the new motor-ship "Bramell Point" will closely be followed by ship-owners not only in America, but all over the world. The machinery of this boat, which is the first of a fleet of four sister-craft to be launched for the Vacuum Oil Co., consists of three Bolinders surface-ignition-type heavy-oil engines of partially new design. This class of engine is usually known as the semi-Diesel, or hot-bulb, type, but "surface-ignition oil-engine" is the best term applicable because of the employment of a hot metallic surface on to which the atomized fuel is sprayed, thus allowing of a water-cooled head and the dispensing of a water-drip in the combustion chamber.

As we always have known it the Bolinders motor ranks among the best that there is, but previous to this the largest unit in service has been of 320-350 b. h. p., therefore, the machinery of "Bramell Point" and of the sister ships, being of 1,650 b. h. p. per ship in three units, is a bold step that deserves success, and if successful as expected may most seriously effect the future of the low-powered true Diesel-engine. While the Bolinder engine today is more expensive than the latter type, it can be marketed at a much lower price, which means that many other makes of surface-ignition engines will also be manufactured in the similar powers, leaving but little field for the small Diesel engine.

Many people consider that the Bolinder Co. are taking a great responsibility, not so much for producing an engine of this size, but by installing three in one ship, for the machinery cannot receive the same amount of attention as would the machinery of a single-screw ship, therefore the chances of troubles developing without being detected in their early stages are greater under the circumstances. Hence this entire fleet of four vessels may be regarded as more or less an important and valuable experiment, although the makers do not consider it an experiment. Then, should they not prove as satisfactory as expected, no bad impression will be left; and should the engines exceed all expectations the greater will be the glory for the makers and the more pleasant the reward for the owners. However, the Bolinder policy is of such a nature that they know well what they are about, and are confident regarding the results.

Before probing into the technical points of the engines we will say a few words regarding the ship herself. Originally "Bramell Point," and her sisters, were laid down for the Transatlantic Motor-ship Co., of Christiania, to the order of Hannevig & Johnsen, of New York, and recently were purchased by her present owners. The designers were Cox & Stevens, of New York.

She is built to Lloyds 100 A1 class and the hull construction is on the Isherwood system of longitutional framing. Her dimensions are 306 ft. over all, 293 ft. between perpendiculars, 47 ft. beam and 28 ft. depth moulded. The draught loaded is 22 ft., the oil being contained in thirteen separate tanks formed by the shell of the vessel and divisional bulkheads, the total tank capacity being 4,700 tons and the gross register about 3,500 tons. The machinery and living quarters are located aft, there being a funnel acting as up-take for the donkey-boiler and also carrying the exhausts from motors; there are three masts, the mizzen fitted with a short derrick boom for handling stores and the fore and main each having heavy cargo booms, served by powerful winches. There is a raised forecastle forward for seagoing purposes, and for housing in the windlass. A speed of 11½ knots is expected.

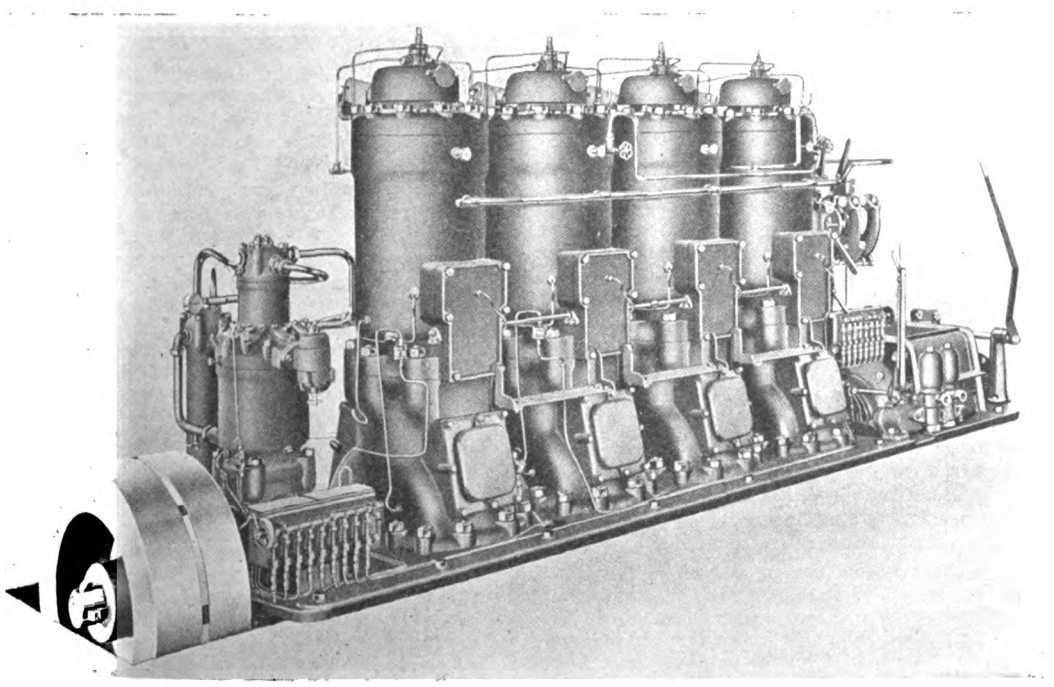


BRAMELL POINT SHORTLY AFTER LAUNCHING

The tank space of the Bramell Point is specially interesting in view of the present controversy and claims made by those advocating the "oil hold" composed of cylindrical tanks as being superior in strength, lightness, capacity and ease of cleaning to the rectangular tanked ship in which the vessel's side is used as a part of the tank walls.

In this vessel there are seven transverse bulkheads with a fore and aft or longitudinal bulkhead amid ships, dividing the hold into twelve tanks, but the upper portion of the tank space in the wings port and starboard is separate. The main tanks being carried up and forming a continuous expansion trunk running over all the tanks. This leaves the wing tanks independent and available for cargo when weather conditions will permit deeper loading.

As regards the auxiliaries it will be seen that these are most carefully planned out. An oil-fired Scotch boiler and a small donkey-boiler, also oil-fired, are installed aft over the main engine compartment, supplying sufficient steam for operating the cargo pump, windlass, heating apparatus, winches and a 10 k. w. electric generating set. The main electric generating set, which is of 35 k. w. capacity, is motor-driven by a Bolinder oil engine. The steering engine is electrically driven, as are also the sanitary pumps. With this arrangement, while at sea no steam need be used at all, unless the temperature is so low as to make heating the oil a necessity, the donkey boiler alone being of sufficient capacity to heat the living quarters if desired. When in port discharging cargo, the full capacity of the steam plant is required.



BOLINDERS ENGINE OF TYPE SIMILAR TO THOSE IN BRAMELL POINT

We can now return to the propelling machinery. At first glance the engines, the models with which we all are familiar, but several radical changes have been made, including the modification to the hot-bulb and cylinder head referred to at the commencement of this article.

Of these improvements Motorship is privileged to be the first to go into details. First of all let us say that each engine has four cylinders, 22 in. bore, by 29 in. stroke, and 550 b. h. p. is developed continuously at 160 r. p. m. As is consistent with the conservative Bolinders policy, it is considerably underated as regards power, for each engine could be made to give close upon 700 b. h. p. if desired. After a year's experience under sea-going conditions, we fully expect the same model to be sold as a 600-625 b. h. p. engine, instead of a 500 b. h. p. set as the makers are now marketing it. It is, of course, direct-reversible, and the old method of reversing by back-fire is still retained, which we are glad to see, for this feature was one of the chief factors that placed the Bolinders engine in the position it today occupies. The 500 h. p. engine is of substantial size, being 27 ft. over all by 10 ft. above shaft in height.

The illustration given is of a smaller model designed along similar lines, and the same shows the new water-cooled-heads and the air-compressor at the forward end. This compressor is used for delivering a steady stream of cool air through a valve in the cylinder head, and this air being directed right on the piston-top should keep the piston cool. The air supply is continuous, and as the same inlet is also used for fuel-injection the fuel is well sprayed over the combustion chamber.

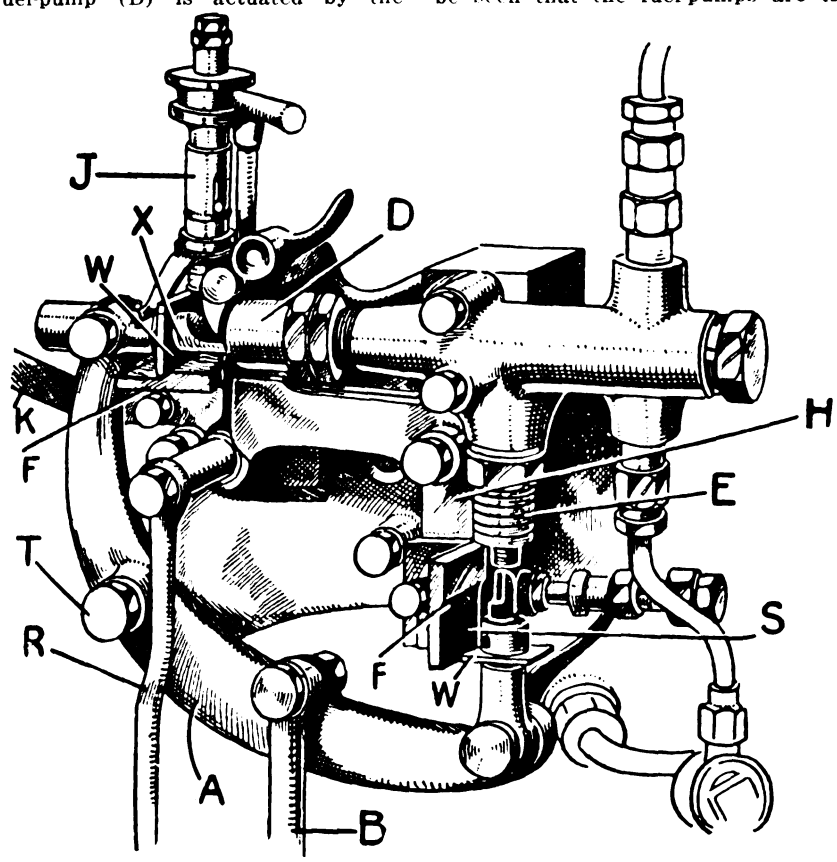
It must not be thought, however, that the fuel is injected by air, as is is not. It is injected by a

pump, the latter injecting the fuel into this current of air. The old type of bulb with two orifices has been discarded, and the new type bulb is quite open to the combustion chamber, or cylinder. It will be remembered that the injection nozzle was inserted in the side of the combustion chamber and squirted the oil upwards. The injection in the new design is in the center of the cylinder-head, and injects downwards in the direction of the piston. A special device in the nozzle atomizes the fuel as it is injected, and sprays the oil all over the hot walls of the bulb, and so it is fired with the aid of the heat of the compression, which, by the way, in itself is of a very moderate temperature.

Particular attention should be given to the sketch of the fuel-pump mechanism (drawn by the Temple Press, Ltd.). For the purpose of simplicity only one set of pumps is shown, whereas in the actual engine there are two sets of this mechanism and two pairs of pumps to each set, each crescent-arm (A) operating two pairs of pumps. "One pair" means the main pump and the auxiliary pump used for reversing.

This mechanism is very simple in operation, although it requires most accurate manufacturing. The main fuel-pump (D) is actuated by the eccentrically mounted on (H) thus the strikers are drawn further apart and so less fuel is injected. Running slowly is similarly controlled and arranged.

When reversing, fuel is cut-off by moving the lever (J) and so decreasing the pressure on the loosely swung striker (X) thus causing it to jump freely at the step. As the engine slackens down a charge of fuel from the auxiliary pump (E) is injected on the up stroke of the piston, causing a back-fire and forcing the piston down again, and thus reversing the motion of the crank-shaft. To bring the auxiliary-pump, which is worked by the lower end of the rocker (A) into action a hand-lever is moved forward. Its lower end is fitted in a friction shoe running loosely on the crank shaft extension, and moving the lever tends to jam the shoe on the rotating shaft. The friction raises the rod (R), which also is attached to the shoe, and, at its upper-end is secured to the bracket containing the stepped-saddles of the main and auxiliary strikers, the former is raised clear and the latter brought into action. One fuel charge from the auxiliary pump is sufficient to reverse the motion when the lever (O) is moved back, and the main pump resumes its work as its striker automatically falls back into position. So it will be seen that the fuel-pumps are thrown in and



BOLINDERS FUEL PUMP MECHANISM

striker (X), which is operated in turn by the crescent-arm (A). This crescent-arm is eccentrically mounted at (H) and is worked by the lever (B) and an eccentric on the engine-shaft.

As the striker (X) is loosely mounted on a pin its squared-collar (W) jumps (when the engine-speed increases too much) on the stepped-saddle (F) and causes the striker to lift; consequently the striker passes over the plunger of the fuel-pump; thus a fuel-injection stroke is missed. To regulate the jumping of the striker there is a spring tension control (J), which can be varied by hand. This is usually used to cut out the fuel for slowing down the engine when reversing; but the fuel control proper is the lever (K) which shortens the stroke of the fuel-pump by lowering the position of the rocker-arm, the whole gear being out of action by the strikers meeting, or missing, each other as the case may be.

Summing up the new Bolinder design from a general point of view, it is an improvement and should give fine results, because the best features of the old design are retained, and additional good features added. However, only actual operation under sea-going conditions will reveal what effects if any, the increased cylinder diameter will have. However, heat conditions are not like with true Diesel-type engines; and the best reason for having confidence in the results is that the Bolinder engineers are absolutely satisfied as to the outcome and soon expect to build up to 1,000 b. h. p. This will be sufficient to most of those who are acquainted with that concern and their policy.

DIESELS REPLACE DIESELS.

Under the title of "A Noteworthy Conversion" there has just been published in "Shipping Illustrated," (N. Y.), an account of the removal of the Diesel engines in the oil tanker Sebastian and the installment of another set of Diesel motors from a different maker. Motorship does not believe that the two-cycle-four-cycle controversy necessarily hinges upon this case as the Sebastians motors were very much out of the ordinary and very severely criticized at the time of their installation for inaccessibility and departure from standard practice.

Shipping Illustrated says, and this reproduction does not imply endorsement:

Special interest attaches to the oil tanker "Sebastian," which was a recent visitor to this port, by reason of the fact that she was recently converted from a two-cycle to a four-cycle Diesel ship; being indeed to date the largest mercantile ship so converted. The "Sebastian" was built in 1914 at Dundee, for the firm of Lane and Macandrew of London, and is a ship of a gross register tonnage of 3,110, with a deadweight capacity of about 4,500 tons. Her dimensions are: Length 310 ft., beam 45 ft., depth moulded 26 ft. 3 in. She is divided into some 28 oil-tight compartments by longitudinal and transverse bulkheads and was designed for a speed of 10½ knots. When she left the builders' yards originally, her motive power consisted of two sets of two-cycle direct reversible Diesel engines of the "Polar" type, manufactured in Sweden by the Aktiebolaget Diesel Motor. These engines had each six cylinders of 16 in. diameter by 22½ in. stroke, each set developing 800 brake horse power at 165 r. p. m. These engines were given a most exhaustive series of trials on the test-bed and the results thus obtained were reported to have been thoroughly satisfactory. Yet, under actual sea-going conditions unexpected troubles developed and the loss of earning power due to the necessity of making frequent repairs in port led the owners to the decision of ripping the engines out. Our information is that the troubles were not due to faulty design or defective workmanship, but can be ascribed only to inherent features of the two-cycle principle and the adoption of the stepped piston. In this case, the stepped pistons were used both for air-starting and as scavenging pumps, so that no cold air was admitted into the combustion chamber. The theory, by the way, that cold starting air admitted to the combustion chamber causes harm to the cylinders and pistons has been proved unfounded in actual practice. Lubrication was one of the chief troubles with the "Sebastian's" engines, it being found almost impossible to properly lubricate the lower halves of the main bearings, even though the engines were virtually swamped with oil. Then, there were heat troubles and serious accumulations of carbon-deposit in the scavenging pumps. The carbon being scraped off the combustion chamber walls by the rings of the working piston. This carbon consisted chiefly of burned lubricating oil. Naturally the accumulation caused abnormal pressures where only 3 to 5 lbs. per square inch was desired. That heat troubles developed is not surprising, when it is considered that in each cylinder no fewer than 165 combustions occurred per minute, without any cooling scavenging-stroke in between; whereas, with her present four-cycle engines there are only 63 combustions per minute with a cool scavenging-stroke between each combustion. Thus it is easy to realize that there is an enormous difference between the mean indicated temperatures of the two types of Diesel engines, and the consequent effects upon the cylinders and the cylinder heads may well be imagined.

The failure of the "Sebastian" did not shake her owners' faith in the Diesel principle because they had had previous and considerable experience with Diesel engines at sea, and knew that in its proper form the Diesel-cycle is as reliable as steam. Hence they placed an order with Werkspoor, Amsterdam, for two direct-reversible 850 b. h. p., 125 r. p. m., four-cycle Diesel engines. These engines have given splendid results during the short time that they have been in service. Their fuel consumption at full load under sea-going conditions is under seven tons of oil per 24-hour day, including auxiliaries. The "Sebastian" will be in New York harbor within a few weeks and local shipowners should take this opportunity to inspect her, as she embodies the latest Werkspoor practice in the design of Diesel machinery for marine use. The Werkspoor Co., who were the first to install a Diesel engine in a full-powered ocean going vessel, have to date engined 24 mercantile vessels and have reached such a degree of perfection in manufacturing that the engines turned out of their shops are now fitted into the hulls for which intended without previous test. In connection with the failure of the "Sebastian's" two-cycle engines, it is interesting to note that engines of the same design are now being manufactured in this country and the performances of ships so fitted will deserve careful attention, in order to see what steps have been taken to avoid the recurrence of the engine troubles experienced with the "Sebastian."

BIG MOTORSHIP VISITS S. F.

Shipping interests of San Francisco and vicinity found matters worthy of their attention in connection with the visit to this port of the Danish motorship Chile, said to be the largest in the world, about the middle of August, although big motor vessels of Scandinavian origin are rapidly losing their novelty, and their successful performance is taken as rather a matter of course. The Chile came in Aug. 13, completing a voyage of 8,526 miles in 49 days, of which only 31 days were spent in traveling. She brought about 1,000 tons of cargo for San Francisco, and 8,500 tons for Oriental ports, to which was added some 2,000 tons of California products. She will return to Europe via Suez. Two similar vessels are now being built at Copenhagen for the East Asiatic Line, which is running the Chile. She is 450 ft. long, 55 ft. in the beam and draws about 27 ft. of water loaded. She makes an average speed of 12 knots.

Wisconsin Opposed Piston Diesel Engine

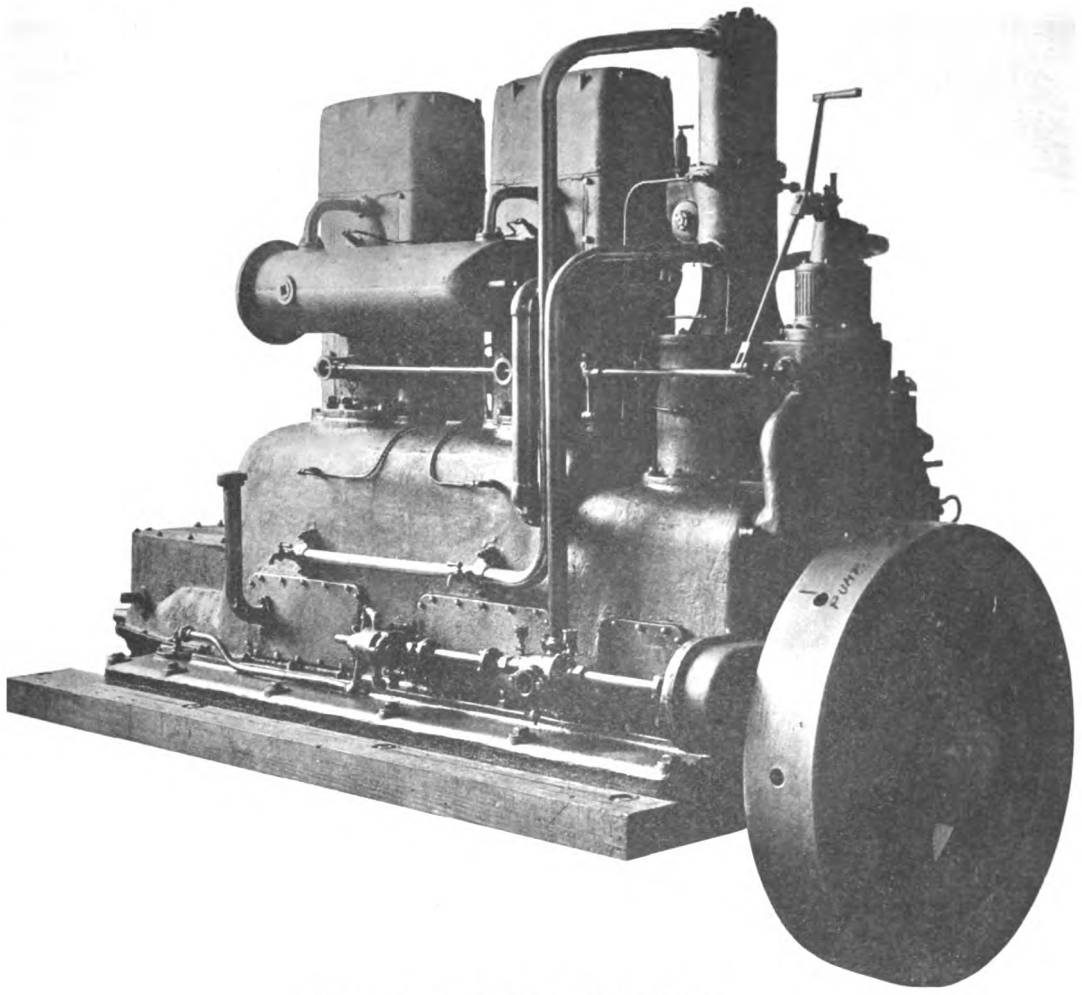
Busch, the famous St. Louis brewer, was the first American to realize the possibilities of the Diesel oil engine, although it is doubtful if he foresaw that this engine would today be propelling great ships around the world, otherwise the great Busch-Sulzer works would be constructing ship's motors instead of limiting their output to stationary and submarine engines. His name is recalled to the writer at the moment because a marine Diesel-type engine has just been produced, after considerable experimenting, in another well-known brewing town, namely Milwaukee, Wis.

This is the Wisconsin engine, built by the Wisconsin Motor Manufacturing Co., who have been building marine motors for many years and whose products are well-known on the Pacific coast; but it is only lately that they turned their attention to developing a Diesel-type motor from their own design. At present they have not attempted high powers, but conservatively are restricting themselves to moderate sizes, but suitable for commercial craft.

In bringing out this engine they departed from the conventional vertical design, and followed the example of the General Electric Co., of America; Wm. Doxfords & Sons, of England; The Frerichs Co., of Osterholtz Scharmbeck; Professor Junkers; the A. E. G. Co., of Germany, and the Weser Co., of Bremen, by designing it on the two-cycle Ochelhauser, or vertical opposed-piston system.

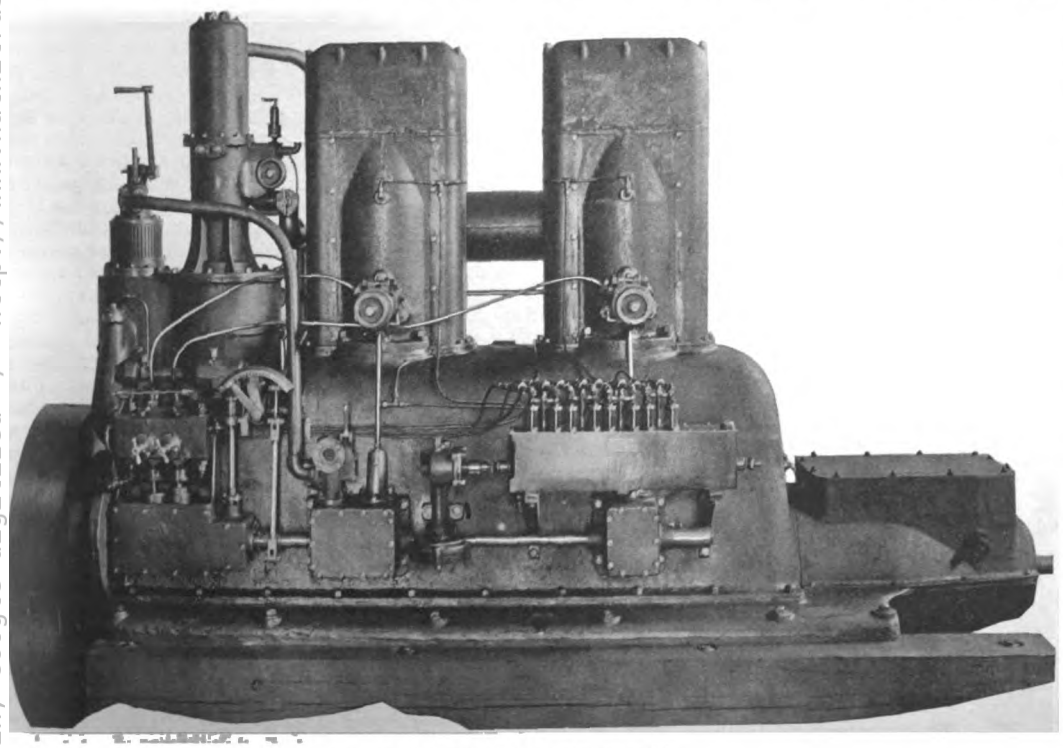
With this design there are two working pistons in each cylinder, which uncover and close exhaust and scavenging ports in the cylinder walls as they move up and down, the latter motion being away from, and toward each other alternately. The two pistons come together until they nearly meet, closing the ports as they move. In coming together they compress the air about 450-500 lbs. per square inch. This causes the air practically to become red-hot, and then fuel is injected by means of the valve and an air blast. Combustion instantly commences, forcing the pistons apart, incidentally turning the crank-shaft. The fuel is not all admitted suddenly, but gradually, the injection continuing approximately for one-tenth of the stroke, the period varying with the load, so the fuel does not explode, but burns, or combusts, and expands as in the ordinary Diesel cycle.

When the pistons are forced wide apart the ports are opened and scavenging occurs again. But it should be understood that this all takes place quicker than one can count because of the speed of the engine, and the cycle of operations as described have to be repeated 400 times each minute. By the arrangements of cranks, one cylinder is firing while the other is exhausting and scavenging, and, of course, the exhaust ports open a little in advance of the scavenging ports so that as the exhaust gases are leaving under their own pressure, the scavenging air comes in and gives them the impetus necessary to clear them entirely out.



STARBOARD VIEW OF WISCONSIN DIESEL

With regard to the operation of the pistons: the lower pistons are connected with the crank-shaft in the usual manner; but the upper piston of each cylinder is fitted with a beam-shaped end, on both sides of which is connected a long piston rod, which transmits the forces of combustion to a pair of cranks, set at opposite angles to the crank of the lower piston. Hence, while the cranks all turn in the same direction, opposite motions are given to the two pistons. The exposed parts of the two upper pistons and their piston-rods are neatly enclosed by a metal casing. To remove the upper piston from the cylinder the upper section of the housing is detached and the yoke is disconnected from its piston-rods, and the piston is lifted upwards. The lower piston is also lifted upwards, after disconnecting the piston-rod from its crank-pin brasses.



PORT VIEW OF WISCONSIN DIESEL

The air-compressor and scavenging pump are mounted in tandem. The latter is double-acting, and is direct connected to the crank-shaft, a guide for it being formed by the lower piston. It pumps air at 2 lbs. per square inch pressure on both the up and the down stroke to a reservoir or receiver mounted on the engine via a piston-valve when it is admitted by ports on the working cylinders as required. Over the scavenging-pump is arranged a two-stage air-compressor, which compresses air for fuel injection. The lower piston compresses the air to a moderate pressure and passes it through a valve to a nigh-stage compressor, thence it passes to steel reservoir bottles. But in compressing this air, it becomes very hot, so before the air goes to the reservoirs it is passed through a coil of tubes contained in a water chamber.

Starting is simple. By turning a hand lever the compressed air is admitted through a distribution valve to which ever side of the double-acting scavenging-pump is in the proper position, and this scavenging-pump temporarily acts as an air motor. The working cylinders then pick up the fuel, and the scavenging-pump resumes its normal duties.

The model illustrated is a two-cylinder, non-reversing set, having 6-in. bore by 14-in. stroke, and developing 60 b. h. p. at 400 r. p. m., but capable of giving at least 30% more power Based upon the satisfactory shop tests, the makers are able to guarantee a full-load fuel consumption of 0.480 lb. per b. h. p. hour, or 0.490 lb. per b. h. p. at half-load, which is much more economical than the average two-cycle marine Diesel engine. The fuels used are the same as with other Diesel type motors; but the above consumptions are when a fuel-oil with an average heating value of about 18,000 b. t. o. is used. It is hardly necessary to add that the consumption throughout is well up to the usual excellent Wisconsin standard practice, if not better.

Babare Schooner Soon to Be Launched

One of the early additions to the new fleet of motor ships will be the vessel now nearing completion in the yards of Babare Bros., Old Town, Tacoma.

With two weeks of construction ahead till the launching, the hull is already rounding out with remarkably graceful lines for a substantial cargo carrier. The accompanying illustration gives a broadside view at the time the planking was being completed, and the first treenails driven home.

The vessel is to be a four masted motor-schooner of 800 tons register, rigged as a bald-headed schooner. Masts are to be one-hundred and seventeen feet in length and the spread of canvas is to be large for a schooner of the bald-headed type. The vessel will have a capacity of one million feet of lumber.

Quarters are provided aft for the officers and engineer under the poop, which is let down to the level of the bulwarks for a distance of about fourteen feet from the stern, affording the wheelsman a comfortable and safe position.

The forecastle is of the usual type, but the cook's galley is unusually large, extending aft from the forecastle to the forward hatch, where donkey is installed under cover.

This motor schooner is being constructed with unusually large hatchways, the deck being reinforced with strong backs running the entire length of the main deck on either side of the hatchways. These timbers are 14x20 inches and add considerably to the strength of the ship. Combings and sides of hatchways are re-inforced with steel plate.

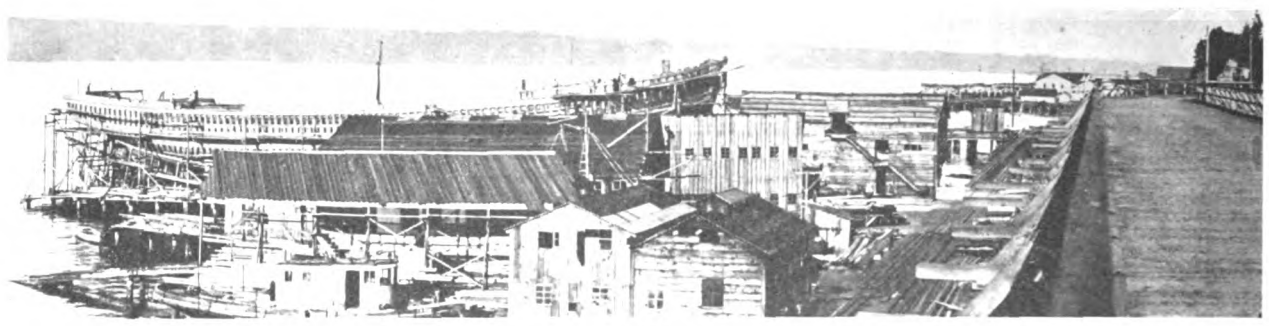
The auxiliary power for the schooner will consist of two 240-h. p. engines of the Diesel type, driving twin propellers. These engines will also light the ship.

Both cabin and forecastle are designed with special attention to the comfort of the captain and the crew, being light and well ventilated. Captain's and second mate's quarters are to be located on the starboard side of the after cabin with pantry between. On the port side will be first mate's and engineer's quarters and bath. Dining saloon in the center is divided by a partition in the middle running athwartships of the vessel. The companionway to the after deck leads up from a hallway from which doors open into bath and after saloon.

Quarters for seamen are arranged in the forecastle head having accommodations for four on each side. Toilets and washroom are forward of crews' quarters on either side.

The length of the schooner is to be 189 feet between perpendiculars and 200 feet over all. She is to have a beam of 42 feet. The keel is constructed of 20x20 in two pieces. The flitch is of 8 inch thickness. Frames are 18 inches moulded at the keel, tapering to 9 inches at the bulwarks, spaced 24-inch centers.

Keelsons are four in number. Sister keelsons are two on each side, one 20″x20″ and the other 16″x20″. Ceiling is 9 inches in thickness with a 10″x11″ sill under the points of the knees. Planking is of four inch, garboard strakes being of seven, six, five inches, respectively; 14″, 12″ and 10″ knees are used on the main deck and 6″x8″ knees under the poop deck. Deck beams and main hatch beams are 12″x16″. Stanchions rest upon hardwood blocks above and below and are secured with iron beam strops. Waterways are in two tiers, the first tier of 12″x14″ placed edgewise. The second tier is of 10″x12″. Turnbuckles rods are ten in number, placed at regular intervals between the beams.



BABARE BROS., TACOMA, SHOWING MOTOR SCHOONER UNDER CONSTRUCTION

The schooner will have a "Lidgerwood" hoist, and the capstan and windlass will be manufactured by the Main Street Iron Works of San Francisco. Much of the equipment, oak chairs and cabin furnishings are being purchased through Seattle firms, also anchors and chain.

Built originally by Babare Bros. to their own account for speculation, this vessel has been sold on the stocks to O. C. Anderson & Co., a Norwegian shipping firm with offices in New York City and a branch office in Portland. She will be launched on the evening of August 30th in the presence of G. M. McDowell, manager of the Anderson office in Portland and a party of friends, C. G. Coker, of Seattle, and party, and other interested persons. Mrs. McDowell will christen the vessel.

FOUR-MASTED AUXILIARY SCHOONERS FOR WASHINGTON SHIPPING CORPORATION.

A brief review of this new corporation was given, together with plan of proposed ship yard, in our May issue. Since when a complete plant for building wooden vessels, up to any length, has been erected and two 250-ft. auxiliary schooners are in course of construction, one vessel, as herein illustrated, being completely framed.

In general description, these vessels are "bald headed" auxiliary schooners, "bald head" being a slang term for pole mast. They are rigged fore and aft and carry lower sails only in most cases; in a few cases with greater length to masthead, they carry jib headed, or masthead, gaff topsails. Viewing the hull now framed, one can obtain an excellent idea of the form of vessel which Designer J. Sloan has considered the most efficient for this class of vessel. Her entrance is short and full, with considerable flare and lifting power; her mid-length sections show a moderate deadrise from keel with a powerful bilge easily curved and which shows no hardness. The buttocks aft have been carried up to give an easy clearance to the propellers and a tremendous length of floor has been obtained without any appearance of wall-sided tubbyness, her quarters being nicely rounded into a good-looking transom. The sheer is an easy curve with liberal spring fore and aft and her buoyant ends with good freeboard when loaded will keep her decks dry in heavy weather. With a new era in wooden ship building and so many of these vessels in course of construction, a brief summary of the scantling table will be of considerable interest. Keel of fir, 20x24, with 6″ shoe of ironbark. Frames of fir (doubled), 27″ moulded at keel, tapering to 10″ at deck. Keelson of fir (sided), 20″x22″, upon which stands a center log 20x20, with two 10″x20″ each side on edge. These are through fastened and clenched on rings at close intervals. All fastenings are heavy galvanized iron drifts clinched on rings. Planking of fir, 8″ and 6″ at garbords, tapering from 5½″ at curve of bilge to 5″ at sides. Ceiling 10″ to 12″ at curve of bilge, tapering to sides. Main deck beams by way of hatches, 18″ sided, with cast steel knees. All others 15″ sided. 'Tween deck beams 14x14 with heavy grown knees to clamp. Clamps 10″ x14″.

The vessel is braced athwartships both at main and 'tween decks with 1½″ rods and turnbuckles covering boards of 10″x16″ material. Deck 4″ fir. Hatch combings 12″x20″ fir. Hatch openings are faced with ½″ boiler plate and steel angles. Hatch beams of steel. Half-inch plates of 24″ width, tapering to 12″ fore and aft, is run the entire length of vessel at under side of main deck beams, each side of hatches. Her spar, rigging and sail plan is of interest also. The four masts are 84 ft. from top of rail to top of cheeks, and 98 ft. from rail to spring stay band. The fore main and mizzen booms are 40 ft. in length. The spanker boom is 48 ft., but measures only 23.8″ on the head. The fore main and mizzen at head being 36 ft., the hoist of these sails varies from 62 to 69 ft. The bowsprit is 40 ft. outboard. A flying jib, jib and staysail form the headsails, where No. 2 canvas is called for. The after canvas all being No. 1. No gaff topsails are called for and mastheads are no longer than necessary for setting up peak halliards. All shrouds and backstays are set up on pipe turnbuckles.

The power for these vessels is derived from twin 240 H. P. Mertz and Weiss heavy oil, direct reversing engines, an independent generating plant being installed between these to drive deck winches and windlass, there being two deck winches at each of the three hatches.

The general dimensions of these vessels are:

Length, O. A., 250 ft.
Keel, 220 ft.
Breadth, moulded, 43 ft.
Depth, moulded, 21 ft.

With a capacity of 1,500,000 B. M. feet of lumber.

The old saying of a mile to windward being worth five to leeward has an amusing bearing upon the auxiliary sailing ship of today, she being almost indifferent as to head winds, for with the wind sufficiently free to allow all her canvas to draw, she can foot it with the smartest square-riggers and outpoint them, as the wind draws aft she will reach like a racing yacht, providing there is enough of it, and at nightfall should it die away, her Diesels will send a wake slipping past at the rate of 5 to 7 knots, according to trim. No tug is requisitioned for making port, and a lee shore no longer has its terrors.

WILL LAUNCH SUBMARINES AT LONG BEACH

The two submarine torpedo boats of the L type, being built by the California Shipbuilding Company at Long Beach, are to be launched some time in September. Some delay has been experienced on account of the strike of machinists and boilermakers which has been on for about five months.

Ernest Hadrath, formerly superintendent of this plant, has resigned his position and gone to Toledo, Ohio, to become superintendent of new construction for the Toledo Shipbuilding Company.

THE FALLACY OF RUMORS AND UNAUTHENTIC STATEMENTS.

During the six years that the ocean-going mercantile motorship industry has been developing into the position that it holds today, builders have had to contend against an unusual amount of discredit and prejudice, which indirectly has been caused by extraordinary and base rumors. Many of the rumors have been unfounded, yet unfortunately were believed by shipowners, or else the same raised serious doubts in their minds.

In the early days brief reports often were telegraphed to this country, re-written and flowered by the daily and non-technical press, only to be re-published in an almost un-recognizable form in the country of its origin.

To give an example of how matter is unwittingly re-hashed, let us take the following extract from a recent issue of a leading New York shipping paper.

> The Dutch technical journal, "Prometheus," indicates that there is building in Germany a submarine-cruiser of 5,000 tons and of 400 feet in length, "as strongly protected and armed as medium-sized cruisers." The propelling machinery is said to develop 18,000 h. p., to give a speed on the surface of 26 knots, and when submerged 16 knots.

Now, it is obvious from the wording that the Dutch (German?) paper was not sure of its facts, and by the time that British periodicals re-print the details, it possibly will be inferred that the ship "is in service." Six months later it may come back to New York, as it already appeared in England.

Probably the first reference to this submarine-cruiser made its appearance after the publication of Jules Vernes' famous novel. But in the issue of the English Motorship and Motorboat (then Motorboat) of January 11th, 1912, there appeared the following paragraph, only Russia was referred to as the constructing country.

> A NEW TYPE OF NAVAL SHIP.
>
> Persistent rumor has credited the Russian Navy authorities with the development of what is termed a submarine-cruiser, a vessel said to be of some 5,000 tons propelled by oil engines. It is not well to accept statements of this nature that are not authenticated, but on the other hand just as there is no smoke without a fire so should such statements, where persistent, not be summarily dismissed. We have lately heard that both the German and British Admiralties have approved plans of oil-engined cruisers designed to run practically awash, cruisers which, being free of top-sides and funnels, will be invisible at relatively short range, and which, therefore, will serve admirably as scouts. This is precisely what the Russian so-called "submarine-cruiser" is stated to be designed for, and possibly the rumors from St. Petersburg have suggested this novel employment of the big oil engines now on order for various navies.

Some years ago the writer was partly responsible for one of the greatest "Spoofs" unwittingly foisted upon a gullible public since the Diesel engine first was invented, and the British technical-journal responsible, came out with the bold statement in all good faith of their accuracy. This was the latter part of 1910 when the writer was on the staff of the journal in question. About that time rumors were circulating regarding the large Russian motor tank-ships, which, by the way, proved correct. There also had previously been a few vague rumors afloat concerning a large motor war-ship.

The writer (who at that time was not properly conversant with Diesel engines, or with the history of their development) was introduced privately to a German of good position in London, who was engaged in importing and exporting engineering products. The conversation turned to the possibilities of motorships, and this man expressed the opinion that before long England would have a motor battleship afloat, and substantiated his statement with photographs and drawings. One of these photographs was of a high single-cylinder engine and the drawings were of a complete engine of similar size. The single-cylinder engine was supposed to be part of the battleship engine then under construction by Vickers, in conjunction with Carels of Ghent, for the British Navy. Also that Krupps and the M. A. N. were similarly occupied on Germany's behalf. Over the whole matter this German was most mysterious in his actions, and absolutely would not allow any of his photographs or drawings to be re-produced.

Although the writer tells the story against himself, he and the editor of the journal, (with whom a meeting was arranged) were completely taken in, thirsty as they were for the knowledge—not to say young and unsophisticated.

However, careful enquiries seemed to support the man's statements, and it was found that Vickers, the great English battleship builders, actually were co-operating with Carels over oil-engines (this afterwards proved to be for submarine purposes) and further the British Admiralty, with their customary vagueness neither would deny nor confirm the matter.

Consequently some vivid drawings were prepared of motor-battleships in action, a schematic sketch was made of one of the 12,000 Diesel engines from our memory of what was shown to us by this German. This, backed by the first photograph to be published of a 1000 h. p. four-cylinder Carel's-design marine Diesel engine, built by the great French naval firm of Schneider & Co., which the writer secured at the last moment, made a striking story, and the next issue came out with a remarkable "scoop" on the new motor battleship.

Advance copies were sent to the daily papers, who reproduced the story, and bill-board men were sent out to promenade the shipping district of London, and large numbers of the issue were sold. Hence, the journal in question soon increased its scope, and changed its title, with the result that its circulation steadily increased, and permanently remained 40 per cent higher.

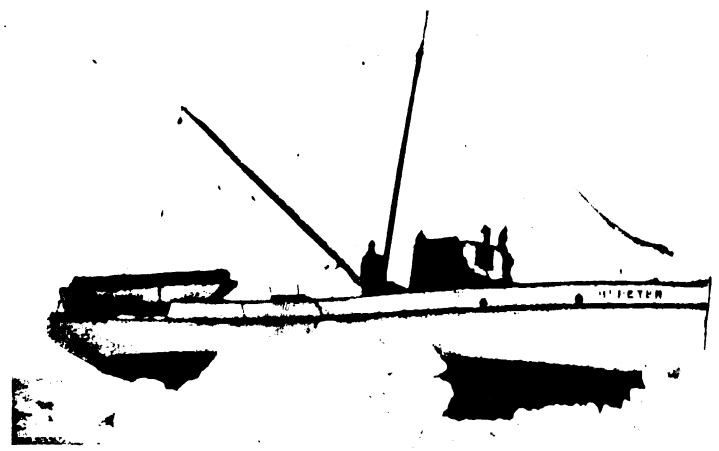
Today that motor battleship has not made its appearance, and is not likely to for many a year. The photograph of the giant single-cylinder engine turned out to be an experimental motor of 1,200-1,500 h. p. that Carels had built Krupps. It afterwards appeared that Krupps also had built a single-cylinder of 2,000 h. p. on the Diesel principle, whilst the M. A. N. were testing a double-acting two-cycle type Diesel engine of 6,000 h. p., which was destroyed by explosion of the air-compressor, or air-bottle. Had the engine been successful the other half would have been built, and installed in some old warship in conjunction with steam engines.

But all this goes to show the foolishness of believing rumors, and the damage that is done to the Diesel engine industry by the publication of unauthenticated statements. Just as the old story of the submarine-cruiser has been revived, (possibly by the advent to the submarine freighter "Deutschland") so the story of the motor battleship annually is revived in some country or other, and makes a faithful appearance in the daily and technical press.

Cannery Tender Shows Endurance

To have built, engined or operated a successful Pacific Coast work boat sometimes means a great deal. Witness the following letter from J. O. Morris, manager of the Everett Packing Co.

"We are sending a picture of our cannery tender St. Peter, taken in the Bering Sea ice off Walrus Island, at the mouth of Herendeen Bay. This boat was eighteen days in the ice, and the crew had abandaned her and camped on shore for fourteen days, giving the boat up for lost. At one time she was fully fifteen feet above the water. One of the members of the crew happened to remember having seen a bottle of black gunpowder on board, and although they had neither caps nor fuse, they attached a wire to the dynamo of the engine, and at high water exploded the powder. It opened the ice sufficiently to drop the boat in the crevice of the ice without even cracking a plank. As the ice broke entirely up and moved out within the next three days, they had no further trouble, and got into the cannery site without further mishap, arriving there May 1st."



CANNERY TENDER ST. PETER IN BERING SEA ICE

SEATTLE SHIPBUILDER LOCATES IN PORTLAND.

E. W. Heath, who has for some years engaged in the shipbuilding business at Seattle, and George E. Hardy, formerly executive secretary of the Portland Chamber of Commerce, have organized the Heath Shipbuilding Company which will immediately lay out an extensive shipyard and begin the construction of several vessels to be powered with oil motors.

This is the culmination of a series of negotiations which has been underway for some time past. Mr. Hardy's interest was directed towards the shipbuilding industry and its possibilities on the Columbia river through the efforts of the Portland Commercial organization to attract there concerns of this character. Following the delivery of his latest vessel, the m. sc. Polar Bear to her owners, Capt. Louis Lane and John Borden, Mr. Heath proceeded to Portland to work out final details.

The new concern has placed an order for the plans of an auxiliary schooner which will be laid down in the new yard at an early date, together with a large Diesel driven freight ship. It is understood that Portland interests have heartily agreed to support the new venture in every way, and, it is therefore probable that every effort will be made to get work under way at the earliest possible date.

It is believed that Mr. Heath will altogether discontinue his operations in Seattle, as he has given up his tenancy of the plant and buildings at Oxbow, which he has been renting from W. E. Boeing. This plant was constructed by Mr. Boeing at the time when he commissioned Heath to build his motor cruiser Taconite, one of the finest vessels of her type ever constructed. Mr. Boeing wanted a boat 90 feet long and was willing to spend $90,000 for her, and in order to have her built in Seattle and built properly he erected the Oxbow yard and rented it to his builder. Meanwhile Mr. Boeing has interested himself in aviation and will, it is understood, use the plant in connection with his hydro-aeroplanes.

Mr. Heath has been building ships since 1886, when he began on the Great Lakes.

Of late years, he has been operating on Puget sound, having been superintendent for the Moran Bros. company. Among the notable ships which he constructed for that firm, is the "Seward" now used by the United States government as a refrigeration ship. She is 210 feet long, 39 feet beam and 18 feet moulded depth. Later he constructed the "Aurora," for Swayne & Hoyt, of San Francisco, and the "S. S. Jefferson." The latter is 228 feet over all, 38 feet six inches beam and 25 feet moulded depth. She is a full cabin passenger ship of 1,200 ton burden. In all, Mr. Heath has constructed 95 boats.

AMERICAN OIL COMPANIES AND MOTOR-SHIPS.

That the great American oil companies are now showing a stronger tendency to adopt motor-ships for their own transportation is a splendid thing for the industry, for, whil'st they stood aloof it was hardly to be expected that other shipowners would abandon steam. Much impetus will now be given to the construction of large internal combustion engined craft by the Vacuum Oil Co.'s purchase, at high cost, of the four 4,500 tons D. W. C. tankers originally ordered by Hannevig & Johnsen, of New York, from the Baltimore Dry Dock and Shipbuilding Co.

Unfortunately, many of the oil companies do not seem to fully realize that it is to their own interests to have every new American ship (up to 10,000 tons) equipped with heavy oil engines, because the resultant economies are so pronounced that, even if they are forced to increase the price of crude oil, it still pays shipowners to operate Diesel and semi-Diesel driven vessels in the face of competition with low cost of coal. For a long distance route, the greatest economy of the motor-ship is not the remarkably low fuel consumption, **but a gain of about 20 per cent additional cargo space.** Hence, under many conditions the fuel-bill of a motor-vessel may even be higher than that of a coal-burning ship without seriously affecting her economical operation. When oil is sold at reasonable prices the fuel-economy of a motor-ship is an additional advantage. Under many circumstances it does not pay to burn oil fuel under the boilers of steam-ships, but such is not the case with motor-ships.

In view of this situation it is up to the big and wealthy oil producers and their affiliated transportation companies to be willing to meet the expense of trying out, if necessary, the different makes of heavy engines, by placing orders and installing them in ships; even if several sets of machinery have to be ripped out later on, which is improbable.

In Europe the first concern to operate big motor-ships was the Nobel Oil Co., of Russia, who, long before the marine Diesel engine was appreciated in America, put a huge fleet of big tow-boats and large tank-ships on the Volga river and the Caspian sea. The Royal Shell interests placed the first full-powered sea-going motor-ship in service, and since have ardently supported the heavy-oil engine, having ten Diesel ships and a couple of "semi-Diesel" craft in active operation. It was Mr. E. M. Smith, the present head of the Shell Company of California, who was responsible for the introduction, many years ago, of the marine kerosene engine into China and recently he ordered some motor vessels for the Pacific Coast of America. His attitude should be followed.

Now for a timely word of warning. The Royal Shell interests with their all-powerful backing are even mightier than the mighty Standard Oil associations, and already are becoming a most serious competitor on the Pacific Coast. The Standard Oil Co., (or rather their German subsidiary) did make a bold attempt to start a motor-ship fleet, but through a little indiscrimination in the choice of machinery burned their fingers, and apparently abandoned Diesels for steam; although in due fairness it should be said that they lately have purchased several large "semi-Diesel" engined vessels, and also are making strong efforts to successfully operate their existing Diesel ships.

The Royal Shell interests have continued building big Diesel ships and are now obtaining remarkable success. When they too burned their fingers, in the case of a big experimental motor-ship, they did not hesitate to rip the machinery out, and replace it with—no, not steam—but Diesel engines of a different type and principle. As the Royal Shell interests are continuing their policy of building motor-tankers they soon will be in the position or having a fleet of ships that can carry an enormous quantity of oil cargo at very low rates, and should they make a really serious bid for a large slice of the American market they will be in a good position to win out, because their means of inexpensive transportation will enable them to longer maintain a low-price war. Let it be remembered that the mill grinds slowly, but sure.

What will prevent such a situation, however, will be an amicable understanding between the two great oil interests. Some years ago the Standard and Shell companies were fighting for the British market, and after a time it dawned upon them that only the public were benefiting; so it was not long before they came to an understanding, with the result that oil-fuel, gasoline and kerosene rose in price steadily and never dropped again.

It perhaps is a good thing too that the great interests behind the Union Oil Co. have other important matters to attend to; because they have even more strongly supported the building of motor-ships, only, all their vessels have been freighters and not tankers. We refer to the Pirrie interests.

But this is wandering a little from the subject, so to our muttons. What are the American oil companies actually doing, may be asked? Nothing approaching what they should do, is the reply! But such that they have started is a distinctly encouraging step. We already have referred to the motor-ships for the Vacuum and the Standard Oil companies and there are the vessels for the Texas Co., now building at their own yard, and the Associated Oil Co.'s boats. The Gulf Refining Co., have for a long while been endeavoring to have a Diesel-driven tanker built and delivered within a reasonable time, but will not order ahead; and for nearly two years the Sun Company have had on charter the first twin-screw Diesel-driven sea-going tanker built. Unfortunately there are several American oil companies who have done nothing except equip barges and small service launches with motors.

It is only to be hoped that in the interest of the motor-ship industry and in the interest of their own oil fuel business that every oil company in America will place an order for an ocean-going Diesel-driven tanker of 3,000 to 10,000 ton D. W. C. without further delay, even though they cannot obtain delivery within eighteen months to two years, and even if it costs them more than steamers. The moral effect produced will eventually favorably reflect upon themselves, and their own business. Also they will strengthen their position against outside competition.

SEATTLE ASTORIA IRON WORKS DEVELOPING A DIESEL.

The well-known manufacturers of the Troyer-Fox gas engines are entering the field of heavy oil engines with a motor of the heavy duty, slow speed, full Diesel type, direct reversing, with the thrust bearing built integral with engine.

The two-cycle principle has been adopted on account of its simplicity and reliability. The first engine, which is nearly completed, is a 150 h. p., 4-cylinder, with all working parts enclosed, the cam-shaft being concealed in an oil-tight pocket on starboard side of the scavenger housing.

General Description.

The stepped piston has been adopted as the best means of scavenging the working cylinder. The lower portion acts as a crosshead as well as a scavening and starting piston with a mechanically operated piston valve controlling the suction and discharge to each scavenging piston as well as the starting air. The compressor is two-stage, driven direct from crank shaft, and mounted on the after end of the engine with the intercooler and aftercooler built into the compressor, eliminating all exposed pipes. The piston heads and combustion chambers are entirely machined in order to prevent any irregularity in combustion space. The high pressure air from the compressor is led directly to valve manifold where it is distributed to the air starting bottles and to spray air bottles and line. This manifold is located on the after end of engine. The fuel valve is placed in the center of a cone-shaped combustion chamber, which forms the head of the cylinder, the cylinder-head being cast integral with the cylinder. The fuel valve sprays the air into the apex of the cone-shaped combustion chamber in a completely atomized form. This fuel valve is the only valve in the head and is completely water-jacketed, as are all other parts exposed to heat, including the bridge walls on the ports of working cylinders.

Mechanical Features.

The cam-shaft, which, as mentioned, is located in pocket on side of scavenging housing, is driven from crank-shaft by spur and bevel gearing to a vertical intermediate shaft, thence to the cam-shaft.

Special attention has been given to accessibility and ease of removing and replacing working parts. The working cylinders and pistons can be dismantled and removed without disturbing any other part of the engine. Large, removable plates on the crank-pit housing give free access to each crank-pit for removing connecting rod or changing brasses. Main crank-shaft bearings can be removed and replaced without disturbing crank-shaft, and when closed the base is oil-tight. Cam-shaft and thrust bearings are also removable without distrubing other parts of engine.

Lubrication.

Extreme care has been given to the lubrication which the designers consider one of the most important items on a Diesel. A circulating system has been adopted which draws the oil from the crank-pit through a strainer, delivering at 10 lbs. pressure. The connecting rods, scavenge-cylinders and wrist-pins are lubricated in addition by a splash system, with the oil maintained at a constant level under each connecting rod, no matter at what angle the vessel may be listed to, nor the angle at which the engine is set in a fore and aft line. A plunger pump is used for circulating and this oil does not need to be of a high quality, as at no time does it come in contact with hot surfaces. A continual stream of oil is forced to all main bearings, crank-pins, cam-shaft bearings, cams, cam-rollers, thrust-bearings and other moving parts. This oil, which is used over again, passes through a cooler whilst in the operation of circulating. In addition to the circulating system, the working cylinders and air compressor are provided with a force-feed lubricator, supplying these parts with Diesel lubricating oil.

Fuel.

The fuel is atomized in the fuel valve and injected into the working cylinder by compressed air at 750 lbs. pressure. The fuel pump which supplies oil to the above fuel valve is located on the after end of the engine, with a separate plunger provided for each cylinder. The engine is governed by a centrifugal ball governor, which varies the quantity of oil pumped at each stroke by regulating the closing of the suction valve.

Centralization and Simplicity of Control.

Every effort has been made to simplify the handling by placing all starting and reverse-governing mechanism on one lever, from which point all other valves controlling the air are within easy reach of the operator, and all gauges are placed directly in front of operator at this point.

The controlling and reverse lever (a one-hand control) works on a quadrant, the lever being set in mid-position for neutral, with movements forward for speeds ahead and aft for reversing.

A slight movement forward rolls the cam-shaft by air pressure to the ahead starting position. A further forward movement opens the air starting valves, at which the engine starts to revolve ahead. A further forward movement of the lever brings the fuel injection valve into operation and closes the air starting valve, a small overlap being allowed in the last two operations.

The reverse is operated in the same manner by moving the lever aft.

General dimensions of the 150 H. P. engine are:

Extreme width of base **40"**
Extreme length of base **11 ft.**
Base, exclusive of thrust **7'8½".**
Height (extreme), shaft center line to top of fuel valve **80"**
Height, shaft center to top of cylinder, **69".**

In brief, no time or expense has been spared by the Seattle Astoria Iron Works in following out their policy of past years in producing a product entirely suitable for the conditions under which it is expected to operate. Mechanical Engineer J. M. Royal, who is responsible for the design, has specialized in oil engines and has made a careful study of Diesel requirements in the Northwest. Mr. Royal has been assisted by Mr. David Davison, who has had 12 years practical experience with marine Diesels in Europe and the U. S.

After rigid shop tests have been completed, announcement will be made of date when engine is to be placed upon the market.

SUMNER MOTOR NEARING COMPLETION.

The first oil engine of the twin set now being built from H. W. Sumner's design at Tacoma is being assembled prior to exhaustive tests which will be made for the purpose of perfecting minor details before the second engine is completed. The Sumner design of oil engine, which was described at length in our May issue, is original and patents applied for which cover these features. A large electric generator and water rheostat are now being installed for testing the engine at full power.

These engines, in units of 400 b. h. p., are four-cylinder, two-cycle, direct-reversing, and are to be installed in the vessels now being built at the Grays Harbor Shipbuilding plant, Aberdeen, to the order of Swayne & Hoyt, San Francisco.

SEATTLE MACHINE WORKS ENTERS FIELD OF DIESEL MANUFACTURERS.

With the revival of wooden shipbuilding for ocean transportation and the advent of motor freight ships, the engine manufacturers on the Pacific Coast have been early in realizing the possibilities of the heavy oil engine, there being fully fifteen of the old established steam and gas engine manufacturers who are at the present time of writing, employed in the different stages of construction and testing of their first Diesel product.

Notably among them is the Seattle Machine Works. Through the courtesy of Manager E. Johnson we have been permitted to view the design from which their engines are being constructed and which are of the full Diesel type. When viewing the works Mr. Johnson pointed out a twin set of triple expansion steam engines aggregating 800 h. p., which are taking the place of Diesel engines originally ordered but which could not be completed in time.

In compliance with Manager Johnson's request and respecting his confidences we are holding over a full technical description of their Diesel until next issue.

PROGRESS AT SEABORN YARD.

Shipbuilding at the new Seaborn plant on the city waterway at Tacoma has followed closely on the activities connected with the construction of the new yards, and the framing of the midship sections of the first ship is now in place. Keel of the second ship has been laid and framing will begin on this ship as soon as it is completed on the first.

First vessel will be 239 feet in length, the second one 165 feet and contrary to first reports they are to be steam schooners instead of motor ships.

TWIN SCREW RIVER BOAT.

Latest among cannery tenders is the shallow draft river vessel "Pioneer," contracted for by the Sea Beach Packing Company of Aberdeen, but later turned over to the Pioneer Packing Company of Seattle.

The accompanying illustration shows the boat immediately after launching at the Babare Bros. plant, Tacoma.

The "Pioneer" has a length of 65 feet and beam of 15 feet. She is not a tunnel stern boat but draws but a little over two feet of water. She is powered with twin 27 h. p. Corliss gas engines, and is equipped with pilot house control and electric lighting plant.

As shown in the illustration, pilot house and galley are located aft on deck. There are accommodations for four men here in deck house. Engine room is just under pilot house. Forward of engine room is the fish hold. Raised deck forward extends only a few feet from the bow of the boat and a heavy deck load may be carried. Oak tow bitts are built aft for towing. Boat will have one mast forward at the break of the deck and heavy boom for lifting cargo. Winch for this purpose is installed on the forward deck and connected with the engine by a shaft under the fish hold.

The Pioneer Packing Company was recently organized to operate a new clam cannery at Cordova. G. P. Halferty is president of the concern.

MERCHANT SUBMARINE TO CARRY COPIES OF "MOTORSHIP" TO GERMANY.

The following interesting letter has been received from Charles von Helmolt, American manager of the North German Lloyd Steamship Co., in reference to the August issue of Motorship, which contained a complete story on the Deutschland.

Editor Motorship.

Dear Sir: The five copies of the August number of "Motorship" have arrived. I have mailed them to Messrs. A. Schumacher & Co., Baltimore, the agents of the Deutsche Ozean-Rhederei, with the request, room permitting, to put them on board the next merchant submarine.

Yours very truly,

C. VON HELMOLT.

FISH BOAT STORY A FAKE.

A story recently appeared in the San Francisco dailies to the effect that the Western California Fish Company had purchased two gasoline boats to take the place of its old reliable steam trawlers, Pedro Costa and Christoforo Colombo, until they also could be powered with gasoline; and one of the papers put in a sob story about how the faithful steam engineers, after years of service, were dumped jobless on the beach. The unqualified success of the new gasoline trawler San Francisco-International No. 1, and the rapacity of steam engineers, lent some color to this yarn, but a little inquiry brings out the fact that the two steamers are merely laid up to be put in shape for the winter, and meanwhile a pair of gasoliners have been chartered to take their places.

WILL MAKE SKANDIA ENGINES IN S. F.

J. H. Hansen, who returned recently from an extended Eastern trip, announced that J. H. Hansen & Co. had taken over the exclusive agency for the sale and manufacture of the Skandia semi-Diesel engine throughout the United States. While in the East, Mr. Hansen placed a subagency in New York, and will himself supervise the work on the Pacific Coast. The necessary patterns for the manufacture of the engines are now on the way out from the East, and on their arrival arrangements will be made immediately for the manufacture of these engines at a San Francisco plant.

MOTORSHIP FOR MEXICO.

Callahan & Cookson, naval architects and boat builders at Los Angeles Harbor, have just received an order for an eighty-foot motorship for the Mexican trade. The boat will be equipped with two 85-horsepower oil engines, the make of which has not as yet been decided upon.

The same firm is making a model for a four-masted schooner for owners on the North Pacific Coast who do not care to reveal their identity at present. The model is already far enough advanced to show splendid lines. It is stated that auxiliary power may be included in the final plans.

DETACHABLE MOTOR FOR CANAL BARGES.

After experimenting on a canal with the propulsion of an unladen coal barge, a concern at Birmingham, England, attached two 3½ H. P. outboard, or detachable, motors to the stern of a loaded barge, and quite a satisfactory speed was attained. It was necessary to make some slight structural alterations to the stern, but at low cost.

MOTORSHIP

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MOTORSHIP'S POLICIES.

Platforms are the order of the day as the fall elections draw nearer, and while Motorship is not in politics, it too has a platform and one, it may be added, which does not depend upon seasonal exigencies. The position of this journal was comprehensively outlined in the first issue, but since Motorship's readers have more than quadrupled since that time the publisher may be pardoned for reciting it here.

Let it be reiterated that Motorship is not the advocate of any particular type of marine motor, be it gasoline, distillate, kerosene or heavy oil; diesel, hot bulb, hot plate; two-cycle, four-cycle or otherwise. It is the aim of the publisher to bend the efforts of this publication towards the careful and accurate assembling of all information of interest or value to the people engaged in building or operating commercial motor vessels or their power plants.

The columns of Motorship will always be open to the man who has something worth while to say to this audience. If there are problems which vex the motorshipping business it is to be hoped that Motorship can be the crucible in which gold and dross may be separated. There are many things in this sphere of activity which are yet to be determined, and it is only through the most complete interchange of ideas between those who are working in parallel lines that the era of motorshipping can be hastened.

Motorship always will be conducted in a scrupulously fair and impartial manner, but its functions will not be limited to passive neutrality for in all things which will serve to advance the legitimate interests of the owners of commercial motor vessels this paper will be constructively aggressive.

NEED FOR COOPERATION AMONG MOTORSHIP OWNERS.

It is surprising to note that as yet no steps have been taken looking towards cooperation among the owners of Motorships. On the Pacific Coast of the United States alone there is now under construction more than forty deep sea motorships. Adding the work in progress at other American yards and abroad the total becomes truly impressive. With particular reference to the situation on the Pacific Coast a careful scrutiny of vessels under way shows that a large number of them are being built to the order of firms which are not actually engaged in the shipping trade. That is to say they are being built for investment by organizations which have been attracted to a new field of endeavor by the unusual profits now in sight. In some cases lumber companies have promoted the building of motorships because of the difficulty in securing bottoms to move the product of their yards. In other cases the owners of suitable but inactive waterfront property have sought to realize upon their investments.

The shipping business is not, however, without its pitfalls. The indifferent success which has attended the efforts to reconstruct the American merchant marine bears eloquent tribute to this fact. Moreover these new comers are entering a trade which is already highly organized and whose present constituents know that the motorship will become a serious competitive factor when ocean trade becomes normal again. It is very easy for shipping to take on the exaggerated appearance of prosperity. Every single inquiry for a vessel which is bruited about soon multiplies itself many times through the energetic efforts of many small ship brokers to place it.

If motorshipping is to progress rapidly, surely and intelligently; cooperation will have to be the order of the day. Any conservative must see that there are still many factors about motorship operation which will have to be determined. The organizations which have had experience in this field over any number of years are still very few, and the information which they have gathered has been for the most part retained for individual use. Upon the thorough dissemination of data of this character depends the immediate success of the business in no small measure.

MAKING A GOAT OF THE NAVAL ARCHITECT.

Great progress has been made in shipping in recent years, but there is one practice which is still a blot upon the face of the industry. The naval architect has been the sufferer and it must be admitted that he has borne his burden for the most part in a quiet unprotesting manner.

Jones wants to build a boat. He lives in Bunkport. In Bunkport are three naval architects, Brown, Black and Blue. Without mentioning his dealings with the other two he goes to each one in turn and asks him to submit tentative sketches, estimates, etc. When he looks over the matter submitted he is pleased by some of the things in each man's plans. He, therefore, takes the three sets to the man who is going to build his boat and says to him:

"Now, see here, I am going to give you the job of building this boat, so you ought to be glad to get up the blue prints which you are to work from without charging me anything."

To this the builder agrees. He wants the work.

Jones continues:

"Take this idea from Brown's plan, this one from Black's and work in that little wrinkle of Blue's. That gives me a pretty fine boat."

To Brown, Black and Blue he says:

"I have decided to let my builder get up plans for me."

Building architects in the past experienced so much of this sort of thing that the members of there organizations have agreed not to submit competitive plans. Some action should be taken along this line by naval architects for their own protection.

Noah built the Ark without a naval Arkitect (so to speak), but the specifications came from heaven.

A WORK WHICH WILL BENEFIT FISHING VESSELS.

A party from the U. S. engineering corps is at present engaged in making a preliminary survey of Dry Pass, a body of water lying between Mitkof island and the mainland, and connecting Frederick Sound and Sumner Strait, in Southeast Alaska. Should the present investigation develop that it will be feasible to dredge the shoal portion of this passage—only a small portion of the total length—and hold the depth dredged, it is probable that Congress will authorize that the work be done. The opening up of this channel to large vessels will result in a big saving in time to commercial and fishing vessels north or south bound, who now have to pass through Wrangell Narrows, some little distance to the westward. It is estimated that the new passage would result in a saving of some fifty to seventy miles over the route at present followed.

LAKE WASHINGTON CANAL OPEN.

The canal connecting lakes Washington and Union with Puget Sound is now open for business, thus making available for commercial purposes the waters of these lakes and the shores surrounding same. Eventually Lake Washington will be utilized by many of the canning companies with headquarters in Seattle for the stowage of vessels during the winter seasons when they are not in use. As the waters of the lake are fresh barnacles cannot gather on the vessels' bottoms thus prolonging their life. The federal government has promulgated rules for the government of the canal and copies of these may be obtained free upon application to the U. S. district engineer, Burke building, Seattle.

DR. JONES IN THE LIMELIGHT.

Much publicity has been given by the daily press to Charles E. Hughes' indictment of President Wilson for the class of appointments made to high office in Washington, and one of the principal cases cited has been that of Dr. E Lester Jones to the position of head of the U. S. coast and geodetic survey. On this appointment Mr. Hughes is reported to have commented as follows:

"We had in the coast and geodetic survey an eminent scientist, a man who had won distinction in connection with his scientific work, a man of very eminent rank. He was displaced to make room for an excellent stock breeder and veterinary surgeon."

While we know nothing of the special circumstances connected with Dr. O. H. Tittman's retirement from the position of head of the survey, and while we feel that Dr. Jones probably would not shine if he had to do the actual scientific work of the survey, yet there is no question but what he has so far proved himself an excellent executive head of the bureau, and through his endeavors has done much to popularize its work, and also to greatly expand and improve it.

BEWARE OF SUBSCRIPTION SWINDLERS!

Swindlers are at work throughout the country soliciting subscriptions for popular periodicals. We urge that no money be paid to strangers even though they exhibit printed matter apparently authorizing them to represent us, and especially when they offer cut rates or a bonus. Better send subscriptions direct, or postpone giving your order until you can make inquiry. If you have reason to suspect that the members of your community are being swindled, notify your chief of police or sheriff, and the publishers, and arrange another interview with the agent, at which you can take such action jointly as may seem proper.

RHONE-MARSEILLES CANAL NEARING COMPLETION.

Despite the labor difficulties due to the war, the construction of the Rhone-Marseilles barge canal, which links up the Mediterranean Sea with the Rhone River at Arles, France, is making good headway, and already $17,800,000 have been spent. It is expected that barges of 600 tons D. W. C. will be able to travel 335 miles up the Saone and the Doubs rivers. The uniform depth of the canal section of the navigation is 6½ ft. with 82 ft. width. After the war there should be a good field in this district for the sale of American-built marine oil engines. Agencies should at once be opened in Marseilles, the great French shipping port.

RELIABLE SERVICE.

The Alice, a 28 h. p. oil-engined cargo boat, owned by T. Stanley Green of Kalmunai, Ceylon, has run 64,025 miles during the nine years she has been placed in service, and although only a few repairs have been made, her engines, says the owner, are as good as ever. Kerosene is used as fuel.

SEATTLE MOTORSHIP RETURNS FOR REPAIRS.

The motorship "Kuskokwim River," owned by Westward Navigation Co., of Seattle, arrived back from Alaska August 12th in tow of the tug Columbia. Propeller trouble having arisen early in the voyage, causing considerable delay, not to mention anxiety to her owners, exceptional fine weather alone enabled the vessel to make port. Had it been unfavorable, she certainly would have been lost.

Plans and general description of this vessel were published in our May issue and being the first motorship on the Pacific Coast on her maiden voyage, the following summary should prove of considerable interest:

Clearing from Seattle at 5 A. M. May 30th, carrying close upon 800 tons of freight, which trimmed her by the head, the vessel's performance in smooth water was all which could be expected except that she was slow in answering the helm, due to insufficient rudder area and being out of trim. The engines were turning from 222 to 224 r. p. m. on a fuel consumption of 20.1 to 22.2 gals. per hour, with lubricating oil at 3 quarts per hour liberally used, as is usual with new engines.

The speed of the vessel under these conditions was 5½ knots, varying to six, according to tide conditions.

May 31st. Weather fair and smooth sea; engines running perfectly at 210 r. p. m., consumption 19.2 gals. per hour, no change in consumption of lubricating oil, and speed 5 to 5½ knots.

June 1st. When approaching Queen Charlotte Sound the port engine gave signs of trouble, which was traced to the propeller having slipped a blade. From this date the constant attention of the engine room staff was required as further trouble developed and no record could be kept of consumption runs and speed under these adverse conditions, which strips the voyage of all interest from a technical standpoint in comparison with cost of operation of a similar vessel equipped with steam.

June 6th, P. M. The port engine was shut down and starboard engine gave signs of trouble. From this date after leaving Kodiak until June 17th it was a series of starts and stops, limping for days and days with one engine running badly. Chief Engineer G. A. Lister is to be highly complimented upon "staying with it" for days and nights without sleep, nursing her along, with constant change of brasses, etc. The exceptional weather which favored alone making it possible to save the vessel.

June 17th she was beached stern first with cargo aboard in Chignik Bay and at low water it was found that there were no blades on the port propeller and two only on the starboard. The tug Columbia was dispatched from Seattle with the nearest things suitable in propellers, which were four bladed and of considerably greater area. But before these reached Chignik the chief had been experimenting with an old propeller picked up at one of the canneries, turning a spare tail shaft down to fit.

This was tried very delicately on the reverse speed and lasted about five minutes.

Following the arrival of the Columbia, the propellers were fitted and under her escort tried out, but the pounding and racking, together with blown joints which followed, decided both captain and chief to abandon all thoughts of proceeding north under power, the Columbia undertaking to tow her north for discharge at Bethel, and from there back to Seattle.

The original propellers, called semi-steel (but which look like cast iron), are now being replaced with bronze wheels at the Seattle Dry Dock & Construction Co.

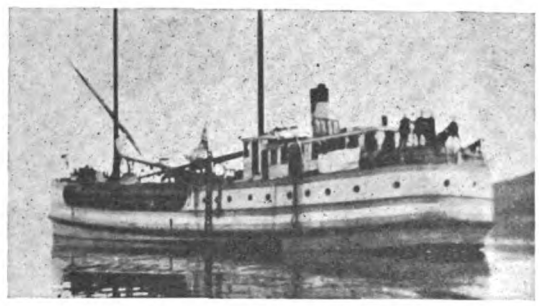
Viewing the vessel in dock she shows a very bad "hog" due to the strain on the beach with cargo aboard, and which will be costly to remedy. Her rudder is being enlarged.

The Mietz & Weiss motors proved their economy and power until propeller trouble arose and the starboard engine with an unbalanced propeller saved the ship under a stress and strain almost beyond belief. All of the vessel's trouble may be traced entirely to her propellers, for the engines being without fly wheels, naturally the loss of proper balance in the propeller made it impossible for the starboard engine to perform its function normally.

It is interesting to note that these heavy oil motors, if closed down on coal oil and started from dead cold on same, require twenty minutes, but if closed down on fuel oil and started on dead cold from same take from 25 to 30 minutes, and the captains in charge of such vessels will do well to bear this in mind when anchoring in exposed positions. To insure more speedy assistance in future Kuskokwim River is to be equipped with wireless.

Kuskokwim River was built by Johnson Bros. and Blanchard of Seattle from designs by L. E. Geary and was launched April 22nd.

Her general dimensions are: Length 150 ft., 35 ft. beam, draft 13 ft., and when leaving Seattle for the North she carried close upon 800



M. S. KUSKOKWIM RIVER AT CHIGNIK
Waiting for new wheels. Her trim is noticeably by the head.

tons of freight. Her power is furnished by twin Meitz and Weiss heavy oil engines, each developing 150 h. p. at 240 r. p. m., turning 3-blade propellers 64" by 45".

The fuel used is commonly called 3c per gallon oil, or $1.25 per barrel. The lubricating oil costs 40c to 41c per gal.

The Kuskokwim, which was hurriedly completed, had practically no trials of value for detecting defects of installation and material (that is, considering the vessel was about to leave for the Far North). She was, after perhaps thirty hours of running, rushed to Tacoma for freight and bundled off to sea in anything but a seagoing condition in so far as her engines were concerned, her designer, L. E. Geary, accompanying her as far as Ketchikan. This is the general rule with a pleasure vessel, but with a deep sea freighter it is somewhat unusual.

The Kuskokwim left Seattle on her second trip for the Kuskokwim river, Aug. 24th, carrying a full cargo.

STANDARD GAS ENGINE CO. ACQUIRES CORLISS.

Announcement has just been made of the purchase by the Standard Gas Engine company of the plant and equipment of the Corliss Gas Engine company. By the terms of the deal which was closed at San Francisco on August 8 the Standard concern will take over at once all of the machinery, engines in stock and in course of construction, raw material, designs and patterns and, in fact, everything entering into the construction of the Corliss gas engine.

While the Standard Gas Engine company has not yet announced in detail its plans for the future it has been definitely decided that in addition to the regular Standard line the complete line of Corliss gas engines will continue to be manufactured. Babare Bros., the present Puget Sound agents for the Corliss will continue to sell this engine through their establishments in Tacoma and Seattle. The decision with regard to other Corliss agencies will be announced in the near future. Present and prospective owners of Corliss engines are assured by the Standard company that a complete line of parts will always be available.

The machinery which has been acquired by this transaction will be concentrated at the Standard plant in Oakland where new buildings are now under construction. The Standard company is to be congratulated on the acquisition of this equipment at a time when machine tools of all sorts are very scarce owing to the heavy demands of the munitions makers. Much of this added machinery will be utilized in the manufacture of Southwark-Harris diesel engines, as recently undertaken by the Standard.

Coincident with the announcement of the purchase of the Corliss comes the news of the retirement of James S. Hawkins as secretary and manager of the Standard. C. C. Kriemler, who has long been associated with Mr. Hawkins, virtually as assistant manager, has been appointed to succeed him and has assumed the active management. This change does not imply any departure from the policy which has made the Standard one of the foremost organizations of its kind in the country, as it will still be operated under the active direction of the owners, George W. Emmons and W. L. Hughson, acting as president and treasurer, respectively. Mr. Kriemler's appointment does not come to the trade altogether as a surprise since his fifteen years continuous service with the Standard makes him Mr. Hawkins' natural successor.

The complete manufacturing crew of the Corliss, headed by the designer and chief engineer, Richard Froboese, have joined the Standard factory organization and will continue to build Corliss engines in their Corliss department. Mr. Froboese is recognized as one of the foremost internal combustion engineers in the United States, and is a valuable addition to the Standard's engineering force.

Arthur B. Cameron, formerly manager of the Corliss Gas Engine Co., but for some time past Northwestern sales manager for the Standard, will act in a similar capacity for both engines in the future. There will be no change in the representatives of the Standard. The Pacific Net & Twine Co. will continue to sell "Frisco Standard" engines.

The purchase of the Corliss marks a new chapter in the history of the gas engine industry on the Pacific Coast. The Standard was organized about 1900 and was incorporated the following year and the Corliss was incorporated in 1902. The Standard has always confined itself to the building of an overhead valve engine with cylinders cast en bloc, in sizes of 4 to 175 h. p. in one, two and three cylinders more particularly. On the other hand the Corliss limited itself to the production of a T-head motor with individual cylinders built in sizes from 7 to 300 h. p., having one, two, three, four or six cylinders. The concentration of these two lines under one roof and one management places the Standard in the enviable position of being able to fill any requirement up to 300 h. p. for either of these recognized successful types of heavy duty engines.

ATLAS AND IMPERIAL CONSOLIDATE.

The Atlas Gas Engine company, of Oakland, and the Imperial Gas Engine company, of San Francisco, have been consolidated by the terms of an arrangement entered into during the first week in August. Various plans have been under consideration for a step in this direction for some time past and the deal was finally effected through the formation of a new corporation to be known as the Atlas-Imperial Engine company and the election of the former officers of both concerns as officials in the new company. Both concerns are numbered among the best known manufacturers of heavy duty engines in the United States and among the pioneers in the Pacific Coast field.

The newly formed corporation advises Motorship by wire that officers have been selected as follows: Axel Warenskjold, president; E. R. Moffitt, vice-president; L. J. Holton, second vice-president; L. A. Moberry, secretary; Maynard E. Wright, treasurer, and J. Lorimer, superintendent. Mr. Warenskjold and Mr. Lorimer were the original founders of the Atlas company in 1903. Mr. Warenskjold was the designer of the Atlas engine and has served as president since its formation while Mr. Lorimer has been in charge of mechanical operations. Mr. Moffitt is one of the oldest factors in the gas engine industry of the Pacific Coast and was one of the founders of the Imperial company, of which he acted as president. Mr. Holton has been heavily interested in the Imperial while Mr. Moberry has been associated with the Atlas company as secretary since 1906. Mr. Wright was vice-president and secretary of the Imperial company prior to the consolidation.

The Atlas-Imperial Engine company, which is capitalized at $1,000,000 will build both Atlas and Imperial engines. The elimination of the word "gas" in the new corporate title is a tacit admission of the present trend of the marine field towards oil motors in the larger sizes. The Atlas company had prior to this amalgamation perfected a diesel engine, the only one of its type to have been developed entirely on the Pacific Coast and it seems not improbable that the additional equipment made available by the union of the two concerns will be utilized in the manufacture of diesel engines.

The main office and works of the new corporation will be located at the present Atlas plant in Oakland, one of the most modern and complete institutions of its character on the coast. The machinery, tools, etc., of the Imperial company will be moved from its former location, 58-62 Clementina street, San Francisco, over to Oakland.

A more complete statement of the policy of the Atlas-Imperial Engine company will be made by the directorate sometime in the near future. Meanwhile patrons of both concerns are insured of more complete facilities and extended service by virtue of the concentration of operations.

MOTOR CRAFT FOR COAST DEFENSE

A Suitable Triple-screw Type.

By R. C. W. Courtney.

A great deal of interest is being shown at the present time in the use of high-speed motor craft for coast defense purposes. Numerous examples of the boats at present in use or likely to be adopted for naval purposes in time of war have been published in this journal from time to time. These boats, however, are practically all of a small type, generally averaging about 50 ft. to 75 ft. in length, and the general opinion seems to be that whilst these boats may be exceedingly useful for despatch-carrying purposes or river and estuary work, and in all probability will in the near future be carried aboard the capital ships of a battle fleet as part of their boat equipment, for coast defense purposes, in the full meaning of the phrase, they would not be of much value. This was clearly indicated in a recent article in The Motor Ship and Motor Boat, in which the writer pointed out that automatic one-pounders and machine guns with which these boats are generally armed would not be of much use against the latest class of German submarine.

The boat in question is therefore intended to be of the following dimensions:—Length, on water-line, 150 ft.; breadth, moulded, 16 ft.; depth, moulded, 9 ft. 8 in.; draught, in loaded condition, 6 ft.

From the accompanying illustration it will be seen that the vessel is generally intended to be built on torpedo boat lines. A raised forecastle is fitted forward extending for over a third of the vessel's length. This should greatly improve her sea-going qualities. It will also be noticed that the stem curves out somewhat after the style of a yacht; this permits of a fuller deck line, and consequently greater flare can be given to the forward part of the vessel, which would also be a great asset for sea-going purposes. The control station is fitted on the aft end of the forecastle head. Two high pole masts are intended to be fitted for signaling purposes and for supporting the wireless aerials.

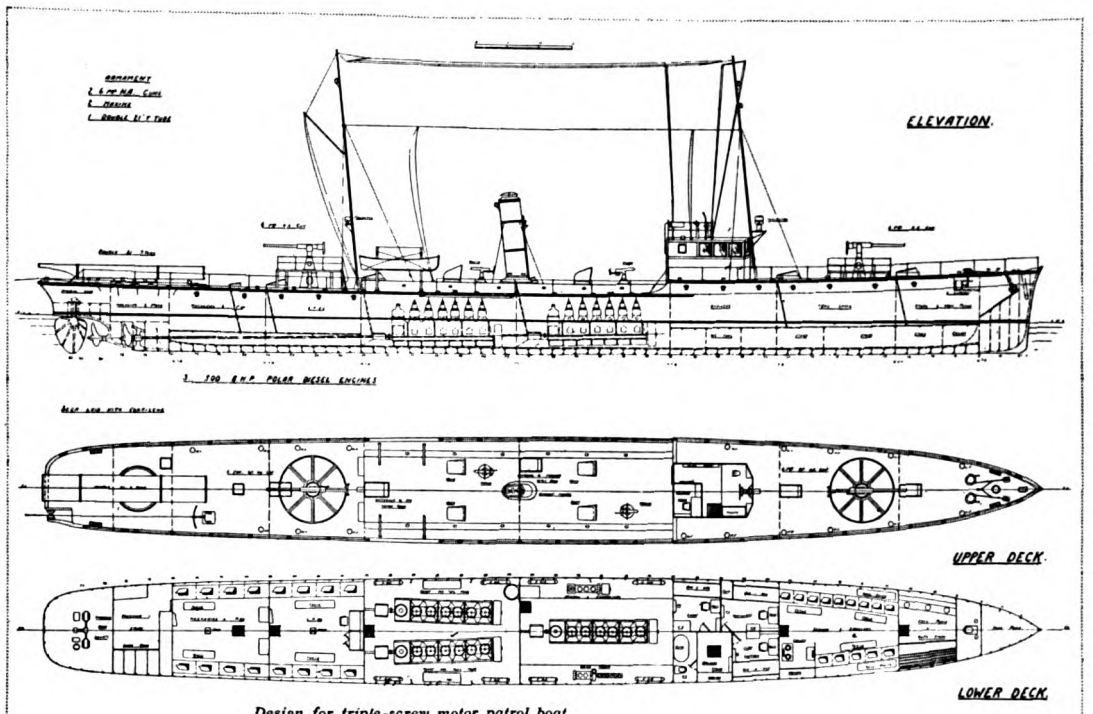
The primary use of this class of vessel would be for scouting purposes along the coast, leaving the more open waters for destroyers; also for the detection of hostile underwater craft which may endeavor to lay mines, etc., at the entrance to various ports. Once the submarine had been located, its destruction would probably be an easy matter, by means best at present left unsaid.

The hull is intended to be constructed of steel, all the principal parts being of high-tensile metal; this makes the hull 30 per cent. stronger than if it were constructed of mild steel of similar scantlings.

Special longitudinal strengthening would be introduced, and the fore part of the vessel would be considerably strengthened for ramming submarines. The principal parts of the hull below the water-line, both external and internal, such as the shell plating, floors, vertical keel and longitudinals would be galvanized.

Accommodation would be provided forward for the commander and officers, immediately below the control station, whilst forward of this seamen and greasers would be berthed. Accommodation for petty officers and mechanics would be provided aft of the engine space.

The armament would consist of two 6-pounder q. f. guns on raised platforms forward and aft. The guns would be capable of being elevated to a considerable angle for firing at hostile air craft. Two machine guns would be arranged, en echelon, on the top of the casing. A double 21 in. torpedo tube would be fitted aft.



Design for triple-screw motor patrol boat.

The machinery would in this case consist of three 500 b. h. p. four-cycle Polar-Diesel engines in two engine rooms. The two wing motors being in the aft compartment, the center motor and auxiliaries in the forward compartment. The fuel would be carried in a specially constructed tank forward of the motor space and in two wing tanks in the forward engine room immediately below the auxiliaries.

The designed speed is 21 knots. It will at once be seen that this boat would form a considerable step towards the adoption of the motor destroyer. The British coastal class, now classed as first-class torpedo boats, are 175 ft. long and have a breadth of 17 ft. 6 in. That internal-combustion engines of the high-speed Diesel type are the most suitable means of propulsion for this type of vessel goes without saying, the only great drawback to their extensive adoption at present being their excessive weight, but this will probably be reduced in due course of time, and it is only up to British manufacturers of oil engines to produce the suitable article as soon as possible.

The vessel in question is only intended as an example for this class of boat, and could doubtless be greatly improved upon, both as regards speed and armament, but for patrolling purposes in places such as along the East Coast this boat would probably be found very suitable.—The Motor Ship and Motor Boat (London).

PROPOSE MOTORSHIP LINE TO AFRICA.

To operate a line of motorships to South Africa is the announced intention of a new concern, organized by Andrew F. Mahony, a well-known local lumber and shipping man, and associates, including Henry A. Jacobs, Chas. Van Damme, Tom Crowley and John Elliott. The company is capitalized at $500,000, and will, it is announced, take the two motorships, Rose Mahony and Andrew Mahony, now being built at Benicia, as soon as they are completed. It is also stated that two similar vessels will be built for the company's use. The two now building are to have Bolinder engines, as formerly mentioned.

AUSTRALIAN SHIPPING MAN VISITS U. S.

C. H. Gibson, a prominent shipping man of Sidney, N. S. W., Australia, was a welcome visitor at the offices of this publication on the eve of going to press.

Mr. Gibson has some very interesting views upon the cooperation of shipowners now entering the field with auxiliary lumber schooners, a subject dealt with in our editorial.

JACOBSON TO VISIT COAST.

Chas. A. Jacobson, head of the Jacobson Motor Co., Saratoga Springs, New York, is preparing to visit the Pacific Coast with a view to personally studying this field, and perfecting arrangements for distribution at the various points along the coast.

REASON OF SHORTAGE OF GASOLINE IN ENGLAND.

In its issue of August 1st, the London Motor makes a strong attack on the government because of apparent rank mismanagement in connection with the petrol (gasoline) supply. Because of the great shortage of fuel, the authorities have imposed a total tax of 24 cents per gallon on gasoline and only allow private motorists to receive enough fuel for 40 miles a day.

Investigations by the Motor reveal the fact that great wastes of this valuable liquid is going on in government departments; cars, ets., even being washed with gasoline. The Motor also discovered that at the time of going to press eight tankships had arrived in port, and were waiting to unload. Their approximate cargoes represented 12,000,00 gallons of fuel. But the principal reason for the shortage of gasoline is due to the fact that ten much needed tankers were commandeered by the government, and converted into transports, others being used for housing laborers. They were held up for three months and then the experiment was found a failure. The Motor writes a nursery rhyme on it, which would be humorous if the matter was not so serious:

Ten useful tanker ships standing in a line,
One was converted, and then there were nine.
Nine useful tanker ships waiting for their fate,
Another one converted, and then there were eight.
Eight useful tanker ships crying loud to Heaven,
Another one dismantled, and then there were seven.
Seven useful tanker ships wait orders most prolix,
Another one "proceeded with," and then there were six.
Six useful tanker ships with barnacles alive,
Another "great experiment," and then there were five.
Five useful tanker ships held fast into the shore,
Another one turned inside-out, and then there were four.
Four useful tanker ships intended for the sea,
Another "houses laborers," and then there were three.
Three useful tanker ships not sailing on the blue,
Another made to carry troops, and then there were two.
Two useful tanker ships, blist'ring in the sun,
Another stripped and altered and then there was one.
One useful tanker ship dejected and alone—
That also must be tampered with, and then there were—the discovery that all the experiments were failures, a shortage of petrol, and a Petrol Control Committee to right the damage that had been done!

N. B.—We, says the Motor, apologize for the scansion of the last line, which has, like the experiments to the ten ships, proved a failure. The rhyme, however, is all right, and if we have used more words than elsewhere in the lines we must excuse ourselves on the ground that we are at war and —"all war is waste."

STANDARD RATINGS FOR POWER AND SPEED

A careful study of the catalogues issued by the makers of petrol and paraffin marine engines reveals a lamentable want of uniformity in the rating for similar cylinder dimensions and speeds among the various firms who produce these prime movers. If, for instance, from a dozen catalogues of well-known makers the b. h. ps are worked out from the cylinder dimensions and revolutions per minute for the sizes given, considerable differences will be found between the figures thus arrived at and the ratings specified. The working out of the h. ps can, of course, only be done by assuming a mean effective pressure in the cylinders. It is better, therefore, for purposes of comparison, to take the maker's highest ratings and speeds, and to calculate therefrom the mean effective pressure upon which they are based. This process, applied to our casual selection of a dozen catalogues, shows pressures ranging between 64 lb. and 91 lb. per sq. in. for four-stroke engines, while the highest and lowest pressures for a two-stroke engine are 64 lb. and 42 lb. respectively.

Then again, the revolutions per minute, upon which the ratings are arrived at, often exceed the speeds at which the engines can be run for any length of time when installed in a boat.

These features must necessarily have a bad effect upon purchasers, as in the preliminary stages of choosing a suitable engine, catalogues are freely consulted and the particulars of different makes carefully compared. As ratings are now given, a buyer may select an engine which appears exactly to suit his requirements as regards power, only to find, when the makers are approached with definite proposals, that the b. h. p. is less than stated in the catalogue, because either the speed or the mean effective pressure has been taken at too high a figure.

Now, the speed in revolutions is largely governed by the piston speed in feet per minute, while the mean effective pressure giving the lowest consumption of oil or petrol should be used as a basis for rating. Piston speeds in feet per minute vary between about 600 for small up to 1000 for the larger engines of the type we are considering. Here, again, the question of economy comes in, as too high a speed involves loss of efficiency, owing to the power needed to draw or force the mixture and exhaust gases through the passages and valves.

What the purchaser of a marine engine wants—other features being equal—is the lowest consumption of petrol or paraffin; and, in this connection, we must remember that marine engines run fully loaded most of the time they are in operation; hence they should give their best economy when developing their full power and speed. The b. h. p., therefore, which any engine is capable of giving out at a certain speed is deceptive without the consumption of fuel at this rating. Moreover, the speed must be such as can be maintained for long periods without undue vibration, wear or heating.

The most efficient mean effective pressures and piston speeds can only be arrived at by a series of exhaustive tests upon different sizes of engine.

It is a remarkable fact that very few results from tests upon petrol and paraffin engines have been published, and we find the authors of books upon the internal-combustion engine, published last year, having recourse to figures from tests carried out in 1908.

Various makers have made tests for their own purposes, but, so far as we know, such figures have never been published. Neither do any trials seem to have been run, for petrol or oil consumption on behalf of purchasers by independent engineers, excepting in the case of hot-bulb engines, which we are not considering here.

Co-operation between manufacturers of all kinds is certain to materialize in this country before long; in fact, the preliminary steps towards this

desirable condition are already being taken. In the near future, we may expect the makers of petrol and paraffin marine engines to put their heads together with a view to deciding upon a satisfactory rating formula. For this purpose, as we have already shown, the only variables to be settled are the mean effective pressure and the piston speed. The former can be the same for all engines of a type, but the latter must vary to some extent with the size of the cylinders. Probably an empirical rule will be instituted, based upon the stroke; and, merely as a proposal, we would suggest that the piston speed in feet per minute should be 500 + (stroke in ins. × 50). This rule gives speeds that accord fairly well with actual practice for the type of engine we are considering, which rarely has a stroke of over 10 ins.

Naturally, the makers, without co-operation, will continue to rate their engines as highly as possible, as this procedure reduces the apparent price per b. h. p. Until, therefore, a standard rating for marine engines is agreed upon, purchasers should demand economy in petrol or oil on a bench test at the rated load and speed, and satisfactory running afloat at the same number of revolutions per minute with an equivalent consumption of fuel.—The Motor Boat and Motor Ship (London).

AUXILIARY SCHOONER FOR LIBBY, McNEILL & LIBBY.

Libby, McNeill & Libby, the well-known salmon packers, have placed an order with Messrs. G. M. Standifer and J. A. Clarkson, of Portland, for the construction of a 4-mast auxiliary schooner to be used in the Alaska salmon trade for delivery about the middle of 1917.

The new boat will be a baldheaded auxiliary, 1,700 ton, 220 ft. o. a. by 42 ft. beam and with a 27 ft. depth moulded. She will be fitted with twin Skandia engines with 240 h. p. in each unit, and will have a fuel capacity of about 1,000 barrels. She is being built from designs prepared by the Skandia Engineering company, and will be equipped with a complete Skandia electrical installation which is direct connected and operating electrical deck hoists and windlass. Vessel, power and auxiliaries are to Lloyds standards.

Standifer and Clarkson, who are also engaged in the shipbuilding business at Astoria, are the lessees of the Monarch mill at Portland. They have contracted with the Peninsular Industrial company for a site at North Portland with a 500-foot water frontage, and have already begun on it a modern wooden shipbuilding plant sufficiently large to accommodate four or five wooden ships.

The Peninsular Industrial company is a corporation controlled by the Swifts, of Chicago, and owns several hundred acres of industrial property at North Portland, obtained some years ago when they established a meat packing plant there.

INVESTIGATION OF KELP HARVESTING IN RELATION TO FISHES.

According to Dr. H. M. Smith, U. S. commissioner of fisheries, "the naturalist of the Albatross has submitted a tentative and preliminary report of observations made early in July to determine the effect of kelp harvesting upon fishes. The observations were made between Point Loma and La Jolla in the vicinity of San Diego, California. Evidence of the presence of fish eggs on the kelp was sought; but in the case of harvesters that grind the kelp as it is cut such evidence of course is not available. Some harvesters do not grind the kelp while cutting it and in such cases the opportunity was afforded for making the desired observations, but no evidence of eggs, fish, or crawfish larvae could be found. On the kelp beds the leaves were examined to a depth of 8 or 10 feet, and the specimens of mollusks, crustaceans, worms, hydroids, etc., collected. Some small fish were taken, but these were not the young of food fishes, since they were mature at one inch in length. No fish eggs could be found.

"Although three harvesters had been working on this bed for more than three months, the amount of kelp at the surface of the water had not decreased appreciably. It is said that if the harvesters begin at one side of the kelp bed and cut it clean as they go, the first part will have grown up again to its natural condition before the whole bed has been passed over. The cutting is done about one fathom below the surface so that only the tips of the fronds are taken and the lower portions of the fronds left undisturbed. When the kelp is cut at high tide the stalks may appear at the surface at low tide, and as the stalks do not stand perpendicularly a change of tide may bring the cut ends to the surface soon after the kelp harvesters have passed over them.

"While the preliminary observations in this region afforded no ground for suspecting that the harvesting of kelp is injurious to important fish or shellfish, the Bureau plans to continue the investigation in a thorough and systematic way."

S. N. CASTLE TO BE COD FISHER.

Advices from San Francisco are to the effect that the barkentine S. N. Castle, 465 tons, was sold on Aug. 2 by George A. Moore & Co. to the Alaska Codfish company. and after making two trips to Honolulu for the Moore company with lumber, will be turned over to her new owners, who expect to use her in the codfish business. The price paid for the vessel was $25,000.

RE AUTHENTIC STEAM AND MOTOR SHIP COMPARISONS.

Editor Motorship.

Dear Sir: A well-known New York shipowner was discussing with me the above article, that appeared in the August issue of Motorship, and pointed out that the comparison table did not clearly demonstrate the savings and economies to be effected by adopting the Diesel ship in preference to oil-fired steam. His reason was that the average shipowner usually is too busy to make the necessary calculations.

Therefore, I give the advantages and disadvantages as follows: The motor ship carries 210 tons less cargo, but

—is 26 ft. shorter O. A.
—has 2 ft. 10½ ins. less draught.
—has the same beam.
—is of 1,220 tons less displacement.
—has 350 less I. H. P.
—has ¾ knot less speed.
—consumes 33½ tons less oil-fuel per day.
—needs 808 tons less bunker capacity.
—can cruise 8,625 miles further than can steamer without refueling.
—saves 14 ft. machinery space.
—saves three firemen.
—saves thousands of dollars in first cost.

Therefore, a shipowner, apart from the fuel cost economy, has two matter to decide:

1. Save first cost by building a smaller ship and carrying the same amount of cargo; or,
2. Building a ship of the same dimensions as the steamer and carrying about 1,000 tons more cargo each voyage.

I trust that several shipowners will write and give their views as to which of the two policies is the better.

Yours very truly,
T. ORCHARD LISLE.

New York, Aug. 14th, 1916.

ANOTHER FLOATING TUNA CANNERY.

In July the Van Camp Sea Food company, of San Pedro, fitted up an old sailing vessel as a floating cannery, and sent it to San Diego in order to handle the catches of tuna made in that vicinity by the company's boats. The vessel is 165 feet in length, with a beam of 25 feet, and is well suited for the purpose to which it has been put. One hundred people will be employed when the cannery is operated to its capacity. Sleeping quarters are provided aboard for fifty men, the women being hauled to and from the cannery each day on lighters.

PACIFIC BURNOIL ENGINE AGENCY.

The Seattle branch of this agency is being reorganized with a view to handle a stock of engines in the smaller sizes, together with a large assortment of spare parts for all sizes.

A change of management will follow the severance of P. L. Van Buren Bell's connection with this agency.

GAERTNER OIL ENGINE PLEASES BUILDERS.

The Marine Mechanical Works, at Los Angeles Harbor, state that they are well pleased with the shop tests made with the Gaertner oil engine, being able to throttle down to sixty revolutions. The difficulty in the past has been to get engines to work evenly at slow speeds, and it is claimed that in rigid tests made with this engine, that this obstacle has been completely overcome. The tests have also revealed many new ideas which will later be incorporated into the final and improved machine.

SO. CALIFORNIA BUILDERS PRAISE CLIMATE.

Southern California boat builders make the claim that wooden boats, or boats built with wooden decks and fixtures, built in that climate, are worth more money than those built at northern ports. They state that the frame has plenty of time to naturally season, during the period of building, while the planking is usually received at the same time and gets thoroughly dry before being placed in position. This obviates recaulking for some time afterward, and makes for better general construction, that, other things being equal, will be conceded by yards located in climates having greater humidity.

SAN PEDRO BUILDERS ENJOY SELVES.

Profits in the construction of motor boats are showing on the surface in Southern California. Joe Fellows, the veteran builder, has just returned from a thirty-day trip, the major portion of the time being spent in Yosemite Valley and at Big Bear Lake. Fellows, instead of using a trailer behind his automobile on which to carry a tent and bedding, used it to carry a flat bottomed skiff. This skiff created great excitement in the famous valley, it being the first boat seen there in fifteen years. Fellows and his nine-year-old son shot some of the rapids in the Merced River, and while no fish were actually caught, some marvelous specimens were seen in the purling waters as they passed down the stream.

Taking the cue from Fellows, Al. Larsen left on Sept. 1 for a trip to the British Columbia line, including all important points on the way. Together with a large party of San Pedro business men, Larsen shipped his machine to Portland, by steamer, and will motor through the Puget Sound country and from there all of the way back home. Larsen considers that this will put him in fine condition for next winter's campaign of boat building.

SAN PEDRO NOTES.

Owing to the exceptionally good catches of tuna since July 15, boat builders and operators are anticipating another good winter in the boat-building business. The season was about three weeks late in starting, but since the first good run at San Diego, about July 10, most of the boats have been doing remarkably well. From five to six tons per boat per day have been almost common, while one boat, owned by A. Oka, is reported to have brought in seven tons. As the minimum price this year is $37.50 per ton, it is easy to see that a good boat, if properly handled, soon pays for itself. Even at a low average, the business is proving most profitable. Oka's catch for the first half of August aggregated, in round figures, a total of fifty tons.

It is stated, however, that owing to the constantly widening radius of action, boats built in the future will have greater length and more power. The greatly increased price of fuel this season has militated against long cruises and systematic scouting, and, on this account, it is thought the season might have started considerably earlier. With cheaper gasoline and larger boats, it is thought this problem may work itself out better next year.

The two new steam schooners to be built by C. E. Fulton at Los Angeles Harbor, respectively for Sudden & Christensen and J. R. Hanify & Co. of San Francisco, are to be named Edna Christensen and Lucinda Hanify. The keels were laid during the last days of August.

Work on the new tugboat Lebec, being built by J. W. Evans at Los Angeles Harbor, for the General Petroleum company, is now well advanced, the launching having taken place late in August.

The new tugboat Vivo, built by William A. Muller for the Wilmington Transportation company, was finished and went into commission August 20. This boat is a sister ship to the boat by the same name, built at the same yard and sold some months ago and taken to San Diego. The boat is also a sister ship to the Listo, which has been very successful as a towboat since it was built in 1912. All of these boats are equipped with Union engines, which have proved most satisfactory.

The California Boat Building Company (J. Hatashita), with a plant near the drawbridge, Los Angeles Harbor, is building a forty-six foot boat for D. Oka, which will be equipped with a forty-horsepower Standard engine.

A. I. Larsen is building a thirty-seven foot boat for the Larco Fish Company, of Santa Barbara, which will be equipped with a twenty-horsepower Standard. Mr. Larsen states that he is preparing for the big rush of business which is expected in the preparation for next year's catch of tuna.

The fishing boat Kiyo, owned by K. Honda, went ashore at Silver Canyon, Santa Catalina Island, on Tuesday night, Aug. 8, while at anchor, and was only saved after suffering damage estimated at $700. The crew had a narrow escape from being drowned. The boat was built by Al. Larsen at Los Angeles Harbor, in 1915, was valued at $3,200, and is now undergoing necessary repairs at his shop on Mormon Island.

The new cruiser Seafarer, recently built at Long Beach, developed a speed of eighteen knots on the trial trip, and will be able to make the run to Avalon in one hour and twenty minutes. The boat is handsomely equipped to carry passengers, and cost $15,000.

L. S. Peters, who is connected with the Pacific Coast branch of the Union Gas Engine Co., spent a week at San Pedro in early August, visiting Col. W. G. Barlow, head of the Southern California branch of the company. Mr. Peters took his first lessons in the mysteries and intricacies of the gas engine from Col. Barlow and learned his lesson so well that they have ever since been fast friends.

O. H. Fisher, president of the company, also visited the southern part of California late in July, taking in various points of interest, thus combining business with pleasure.

The Standard Gas Engine company, having absorbed the Corliss Gas Engine company, the C. J. Hendry Company, of San Pedro, have been made the agents for both engines for Los Angeles Harbor. W. J. Maggio, the local manager, states that eight engines were sold during August, indicating the trend of the boat-building business for the coming season. Much, of course, depends on how long the tuna run, but if anything like the present conditions prevail to the usual end of the season, it is predicted that the fleet will be nearly doubled by the time the season opens for 1917. P. Martin is in charge of the marine engine department for the Hendry company. This firm is now laying in a full line of accessories and parts for engines.

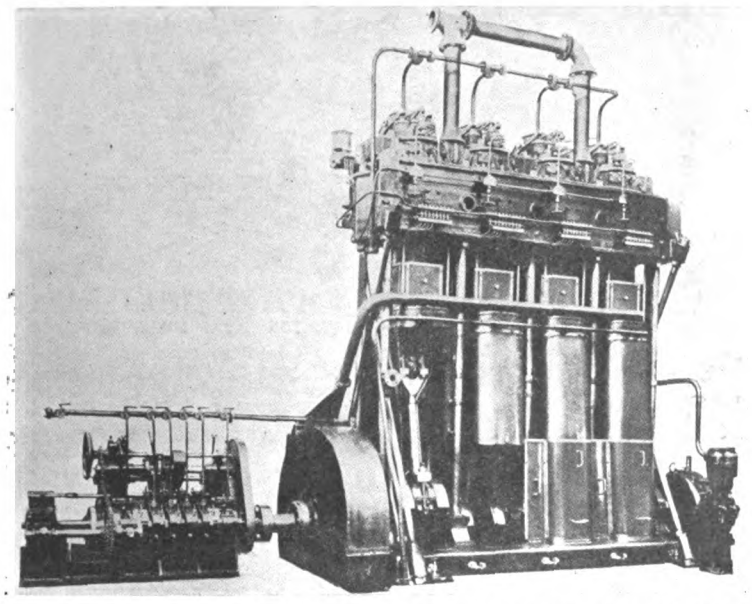
J. M. Shuck, formerly Los Angeles agent for the Standard, has been promoted to the position of sales manager for the entire territory of Southern California.

Prices have been cut very deep during recent months, naked engines that formerly sold at $2,150 now being delivered, installed, for $1,600.

A Motorship with Unusual Machinery

(Continued from Page 4.)

actual swivelling of the blades in the boss is a fairly simple matter and largely depends on having a boss big enough to contain moving parts of ample strength, which is not difficult if the needs are properly appreciated and due consideration is given to the comparative uselessness of the central part of the blades. The working parts consist of a central three-armed casting carried on a rod which passes through the hollow tail-shaft. Each of these arms is connected through a link to a pin on the blade flange, so that movement of the casting in a fore-and-aft direction swings the blades round through the necessary angle to give ahead or astern motion to the ship. The method of operating the control rod in the tail-shaft is not so simple, in view of the fact that connection has to be made from a stationary part to a revolving part, of the need for great



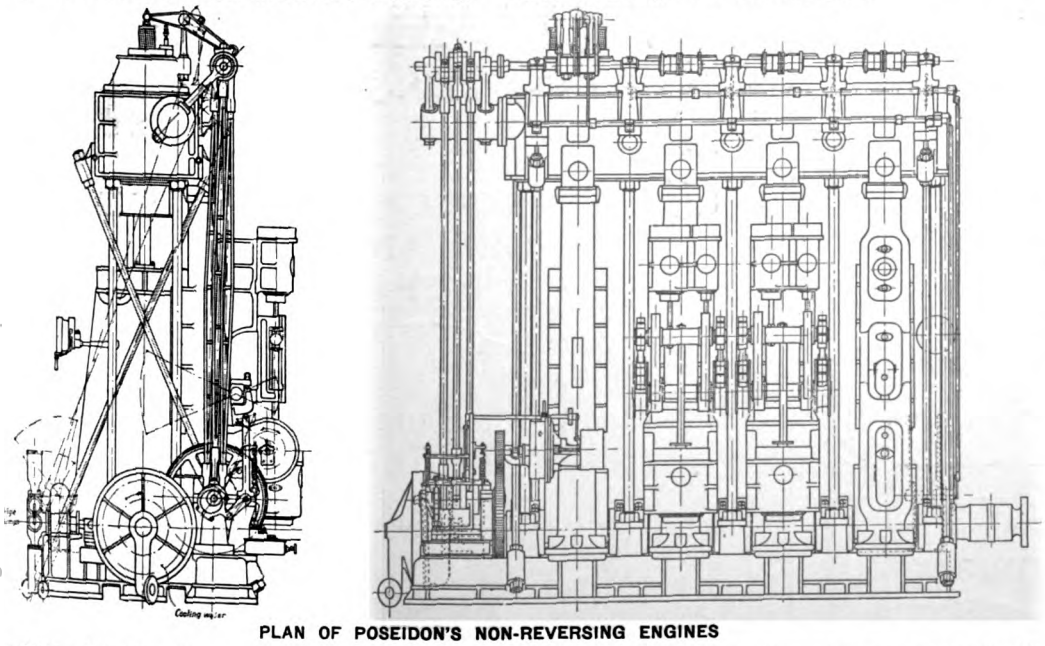
THE 450 I. H. P. ENGINE OF THE POSEIDON WITH THE PROPELLER REVERSING MECHANISM

rigidity and strength throughout, and the larger power required to reverse the blades when the ship is under way.

The thrust-shaft carries upon its after end a sleeve, which can slide fore and aft on a key, and to the after end of this sleeve are attached two rods fitted with jaws at their after ends, which grip a collar on the forward end of the central rods in the tail shaft. On the outside of this sleeve are turned three thrust collars, which take the thrust due either to the tendency of the blades to rotate in the boss when in a "linked up" stationary part and gives the ahead or the astern position of the blades, according to whether it is at the forward or after end of its travel, or gives a neutral position if it is in the centre of its travel.

By means of a constantly running chain-drive from the forward end of the thrust-shaft power is taken from the main engine itself to perform the actual reversal of the blades in either direction. Thus if ahead gear is required the hand-wheel shown at the after end of the apparatus is turned in one direction, and this puts a cone-clutch into gear, which has the effect of carrying a straight-through drive from the forward chain-wheel to the after chain-pinion and so through the block-chain to the screws on the auxiliary thrust-block; the hunting-lever arrangement shown draws the clutch out of gear again as the block takes up the position corresponding to the hand-wheel, just as in a steam-steering gear.

If astern gear is required the hand-wheel is turned in the opposite direction and this engages a second clutch on the same shaft with the spur-wheel shown, and the drive is then transmitted through the gearing to the other chain pinion and the screws wind the thrust-block in the opposite direction, the hunting-gear again coming into action as before to put out the clutch. Naturally any intermediate position of the blades between ahead and astern gear can thus be obtained, the conditions being exactly similar to those existing in a steering-gear.



PLAN OF POSEIDON'S NON-REVERSING ENGINES

position when the ship is under way, or to the reversing-gear when altering the angle of the blades. These collars are embedded in an auxiliary thrust-block, which can be moved forward or aft by means of the screwed rods shown attached to chain-wheels and which forms the necessary connection between the rotating part and the

In conclusion the writer wishes to express his indebtedness for some of the information and arguments to Mr. Basil Joy of the London "Engineer," who was aboard the "Poseidon" during her trials. The fuel consumption for all purposes under service conditions is 1.7 tons per 24-hour day, together with 16 gallons of lubricating oil, which are very economical for a ship carrying 835 tons of cargo. The auxiliaries such as the electric lighting set, cargo pumps, winches, etc., are steam driven by a donkey-boiler fired by the exhaust-gases from the main engine, or oil-fired when in port, and at night time at sea.

SAN FRANCISCO NOTES.

Dave Dickie, of D. W. & R. Z. Dickie, the San Francisco marine architects, is making a month's trip through the East.

The Union Iron Works is remodeling Barge No. 8 of the Standard Oil Company, and will put in a 150 h. p. Union engine.

The Nuuanu's Bolinder engine arrived in port a few days ago, having been delayed in shipment, and the installation is being rushed as fast as possible.

Henry Peterson, of the Peterson Launch Company, is making a two months' tour of the East having left a couple of weeks ago to attend the meeting of the Association of Amateur Oarsmen at Duluth, Minn.

The Island Transportation Company of Stockton has placed an order with Stephens Bros. of that city for the construction of a new 50-ft. towboat. It will be 14 ft. wide, with a 150 h. p. gasoline engine, make not yet announced.

The power schooner Hugh Hogan was recently moved from Frank Stone's to Hanlon's ways, where she was hauled out for the installation of her 160 h. p. Bolinder engines. She will begin loading cargo for the south coast about the end of the month.

The Matson Navigation Company's bark R. P. Rithet has been at the Union Iron Works for the last month, as she is having extensive alterations made, particularly in the construction of another deck, which will make her an altogether different vessel. Her twin 160 h. p. Bolinder engines were put in early in the month, and she will be ready to resume service within a few days.

A new government ferry boat, named the Admiral Glass, which is powered with a pair of twin 80 h. p. Union engines, was launched from the Mare Island Navy Yard about the end of July. She is intended to take care of the heavy passenger traffic between San Francisco and the Naval Training Station on Goat Island, for which the old tug has become entirely inadequate. She had her trial trip Aug. 16, and gave a very satisfactory performance, making better time than was expected.

The Terza Italia, the handsome power schooner built for the Angelo Farce Company of Callao by Schultz, Robertson & Schultz, was put in the water early this month, and is now being equipped with her 125 h. p. Skandia semi-Diesel engine. As this is the first Skandia installation to be completed here, the work is being watched with no little interest. The frames are now being set up for the duplicate to the Terza Italia, for which the owners let the contract last month to Schultz, Robertson & Schultz; and the small boat for the same owners at Anderson's shop is about finished.

CROWLEYS BUILDING BARGES.

A pair of the new-style freight barges, which, it is predicted, will revolutionize the transportation business on the Mississippi River and of which a full description recently appeared in an Eastern publication, are to be built by the Crowley Launch & Towboat Company, as it is believed that this type of barge will serve equally well on San Francisco Bay. The barges look like floating warehouses, being completely walled in and covered, giving their freight full protection from rain or spray; while the arrangement of doors, etc., makes it possible to load and unload quickly and with great economy of power. The boats are long in shape, and of light draft, suitable for work in the shoal waters of the upper bay and around the mud flats, and at the same time easily handled. The two being built by the Crowleys will have a capacity of 750 tons each; and while they will have no motive power of their own, each will be equipped with a powerful gas-driven electric generator to run the loading machinery.

The Crowleys are selling off some of their surplus boats left from the Exposition, and four of the large ones: the 14, 15, 19 and 20, are practically sold already. All but the No. 14 will be shipped away; the 14 has been taken by a local quarry firm for towing its rock barges. These are very useful, all-round boats, being well adapted for towing, freight or passenger use.